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RECENT METHODS OF TRANSMITTING CONCRETE

Use of Compressed Air for Both Mixing and Transmitting—Success Depends Upon Size of Pipe, Nature of Aggregates and Other Details—Apparatus Employed—Use in Lining Sewer.

BY J. F. SPRINGER.

Doubtless the idea of using compressed air as a means of driving cement mortar and concrete from the mixer to the point of use is not precisely new. It is possible too that under some favorable conditions a certain amount of success may have been attained in connection with one or two attempts to use it thus. But the writer has reason to believe that no substantial and continued success under the ordinary everyday conditions of concrete transportation was attained with concrete containing heavy aggregate until rather recently, when there was developed a system which has demonstrated its practicability under varied and severe conditions. I shall give an account of this system and also of a system which uses superheated steam.*

One of the principal difficulties to be overcome was the tendency to clog. There is comparatively little or no difficulty where it is merely cement grout or cement mortar that has to be transmitted, but the introduction of $\frac{3}{4}$ and 1-inch stone causes a liability to clog the transmission pipe, and so prevent further operations until the clogging has been cleared. At times, it is understood, it has been necessary to resort to the heroic remedy of cutting into the pipe line. However, this matter is now better understood; so that the clogging is of comparatively unusual occurrence with experienced handling. One of the chief factors in the solution is to require a large enough pipe line. For 2-inch stone, 8 inches is the diameter specified; and for $1\frac{1}{2}$ -inch stone, 6 or 7-inch pipe. The amount of water in the concrete plays little or no part. Dry concrete may, in fact, be forced through the line. Another factor is the sand. If it contains a considerable percentage of sticky material, the speed may be cut down.

In the new system, the mixing is done in a special piece of apparatus containing no paddles or other movable parts, the mixing being largely effected by blasts of compressed air, and completed during the first stage of transmission. The shape and arrangement of the interior of the mixer and of the first part of the pipe line play their part in the mixing. Transmission is effected by the air forcing its way under steady pressure, once the charge has been fairly started. Placing also is done by the air. At times the concrete will have a velocity of 50 feet per second, and as the concrete goes into the form in a rush and under pressure, tamping is unnecessary. There is no trouble because of air bubbles entrained in the mass, as the compressed air mingled with the concrete readily expands and escapes. Mixing, transmitting, placing and tamping are all performed as substantially one operation.

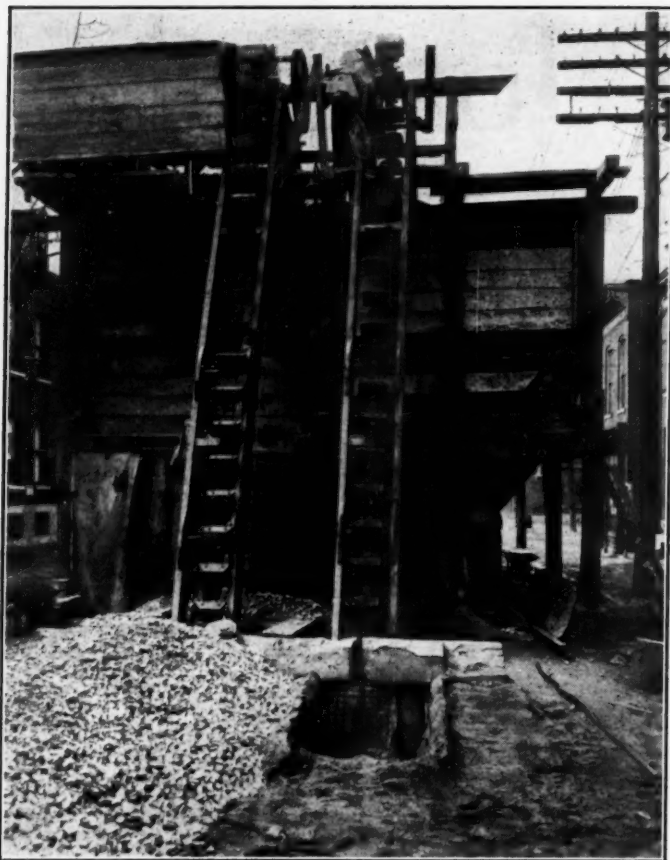
*The latter will be described next week.

The concrete is handled a batch at a time, one batch being out of the mixer and gone before the next is admitted. How much concrete can be transmitted per minute or hour turns largely on the way the machine is fed and operated. It depends in part, as already stated, upon whether there is present a large percentage of sticky material in the sand. Also if the size of the large aggregate varies too much, that may decrease speed. The proportion of fines should be small.

The pipe line may consist of ordinary steel tubing having a smooth interior. At the delivery end, it will often be convenient to have a short length of flexible tubing of the same size as the steel pipe, in order to provide for variations in point of delivery. The length of this tubing may be from 6 to 10 feet.

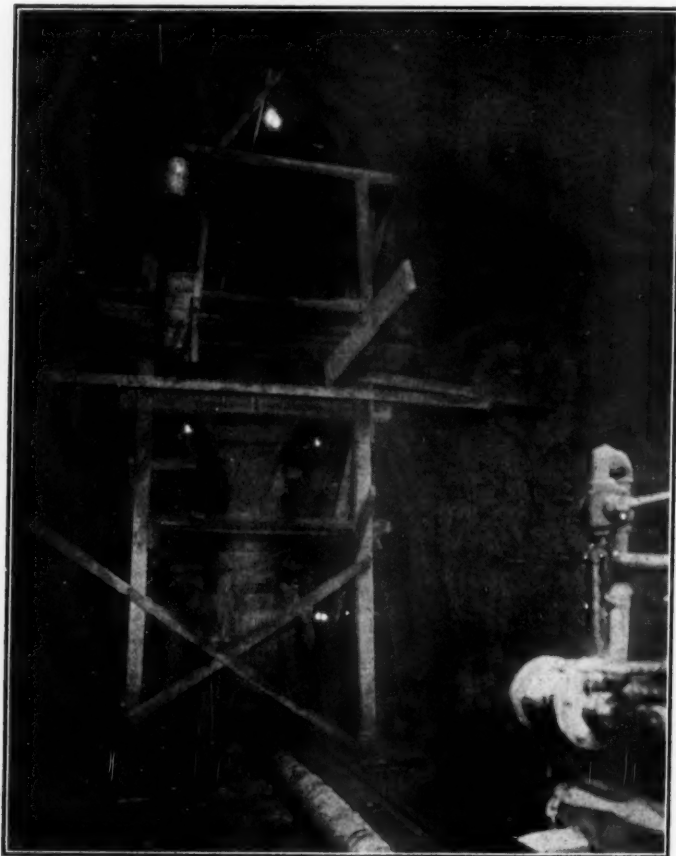
With conditions favorable, a small mixer having a capacity of about $\frac{1}{4}$ cubic yard can, it is claimed, deliver some 20 cubic yards of concrete an hour over a distance of 600 ft. The capacity goes down as the length of the line increases and up as the length decreases. However, this small machine is understood to be good for 15 cubic yards over a distance of 1,000 feet. This size of mixer is very suitable for sewers and other small tunnels. There is no need of the concrete capacity exceeding to any substantial extent the form capacity. In seeking to get a practical working idea of the capacity, it will be better to estimate a lower output. With a compressor capacity of 800 cubic feet of free air per minute and a transmission line 600 feet long, the concrete capacity may be taken as 14 cubic yards per hour. Cutting the length of transmission line in two, results in increasing the output to 18 cubic yards. Increasing the line to 1,000 feet, cuts the output to 8. The size of pipe assumed in the foregoing is that having 6 or 7 inches diameter. With a smaller pipe and with the $\frac{1}{4}$ -yard mixer, compressor capacities down to 350 cubic feet of free air per minute may be employed. Naturally, the lower capacities fall short in radius of delivery and in capacity. The amount of air consumed is less with the smaller pipe than with the larger. A $\frac{1}{4}$ -yard mixer driving concrete through an 8-inch pipe will often use up more air, even though the distance and output be kept the same.

The pipe line may be arranged with vertical and horizontal curves, but they should have a generous radius of curvature. No right-angled elbows should be used. The line may easily be shortened or lengthened. This is a matter of the greatest importance, because of the freedom it permits in carrying out the work. Pretty much everywhere a pipe can be put in, the concrete will flow and for considerable distances from the mixer.



BINS FOR CONCRETE AGGREGATES, MILL CREEK SEWER.

From these the aggregates are dropped through a vertical chute into a hopper in the tunnel.



IN MILL CREEK SEWER, ST. LOUIS.

At the top, hopper which receives aggregates dropped from above. Below this, the compressed air mixer, leading from the bottom of which is the transmission line.

The equipment required includes, besides mixer, pipe line and compressor, a special air receiver in addition to the one which goes with the compressor. This special tank, of perhaps 100 cubic feet capacity, is set up near the mixer. The storage bins may be of ordinary design. A measuring hopper will be set up over the mixer, so as to make convenient delivery to the latter, and all the materials, including the water, are discharged into the mixer.

The mixer is a metal tank cylindrical in form in the upper part and conical below. The cone tapers to join the transmission pipe, and the latter, just below this junction, bends sharply to a horizontal. When the materials are put in, they naturally settle down, partly in the cone and partly in the sharp bend of the pipe line. A small air piston-and-cylinder is now operated to close the door at the top, whereupon air is admitted either at the top of the mixer, in the portion where the door swings on its horizontal hinge, or at the elbow of the transmission pipe, the air coming in in line with the horizontal pipe. After a few openings and shuttings of the controlling valves, the materials are largely mingled, and are then shot off through the pipe line, the completion of the mixing being done in the early part of this transmission. The mixer itself contains no moving parts—only the inlets of the air jets. At the beginning a rather heavy pressure of 80 pounds or more may be used; but once the charge is fairly started, the pressure may be reduced to about half, or perhaps a little less. The heavy pressure is needed largely for the purpose of overcoming initial inertia.

Some idea of the rapidity with which batches can be handled may be gathered from the following data. In one case the pipe line was very short and of 8-inch diameter. When the operators had become accustomed to the details, they were able to despatch 423 batches in 381 minutes—an average of 54 seconds per batch. A day or so later, 448 batches were sent in 340 minutes, thus reducing the average to 45½ seconds. The mixer in this case had a capacity of about 0.4 cubic yard. The air consumed in this work was supplied by two compressors having a combined capacity of about 750 cubic feet of free air per minute. The use of a single compressor resulted in a batch requiring about 1¼ minutes.

In illustration of the adaptability of the system to sewer construction may be cited the case of the Mill Creek sewer at St. Louis. A large section of this conduit lies far below the surface, part being a pressure tunnel in rock. It was deemed expedient to concrete the excavation, thus providing for overhead support and a smooth channel for the flow of the sewage. A horseshoe section was adopted, the invert being quite flat. The thickness of the concrete varied from point to point of the section and with the irregularities of the excavation, but averaged about 18 inches. A method of placing the concrete was desired suitable to the confined space and the underground situation, and adapted to a continually shifting point of application. This the pneumatic system supplied in what seems to be an admirable way.

On the surface at the middle of a section of tunnel 1,900 feet long were located bins for stone and sand, the bins being filled by bucket elevators. From the bins the stone and sand were run into a measuring hopper and cement added.

Beneath the measuring hopper, a vertical hole had been put down to the sewer tunnel, where another hopper received the concrete materials as they were shot down through the hole from above, and fed them to the mixer. The operation of the mixer was much the same as has been described. The transmission line was laid first in the one direction and then, when that half had

been completed, in the other. The maximum transmission was thus 950 feet.

This system has been found adapted to a movable mixing plant. A tunnel on the Carolina, Clinchfield & Ohio Railway was lined with the aid of a self-propelled car carrying materials and equipment. Another type, a car which had to be moved by a locomotive, was used on the Chicago, Burlington & Quincy R. R. for lining a tunnel on their railroad. The general idea of putting everything on board a single conveyance would seem to have its merits, even though horses or mules were used to shift it from point to point.

The general scheme is as follows: A sand bin is placed at one end of the car and a stone bin at the other, and the mixer between them. In the C. C and O. car, the water tank was over the mixing compartment. (In some cases it might not be necessary to provide for water.) The material bins discharged by chutes into a skip in the central compartment. The cement was put in by hand. Beneath the sloping bottom of one of the bins was set the air receiver, which provided power for operating the skip as well as for mixing and transmitting the concrete. The skip with its load of materials, would be transferred by a cylinder-and-piston device to a point over the mixer, into which it would discharge. The mixer delivered to the pipe line, which in this case was very short, running beneath the car to one end, where it could be delivered either

to a vertical branch for overhead placing or to one leading to the side. The air tank was replenished when necessary from a stationary compressing plant.

The general system is operated by a very small number of men. One man is needed at the mixer who has a certain amount of skill and good sense, and one is needed at the discharge end. The number required for feeding the mixer turns on the arrangements and output.



CONCRETING CAR FOR COMPRESSED AIR MIXING AND TRANSMISSION.
Car used by C. C. & O. R. R. Shows mixer and chutes from bins.

PRACTICAL STREET CONSTRUCTION---STREET GRADES

Minimum and Maximum Limits of Street Grades—Effect of Grade on Traction Resistance—Maximum Grades in Several Cities

From the point of view of traffic, a perfectly level street is most desirable. In some sections of the country it would be possible to have a large percentage of the streets perfectly level; in fact, in almost any locality it is possible to secure level locations for at least 50 per cent of the streets by following contours and making cuts and fills.

Where the roadway is paved in any way, however, or an unpaved road is on any but the most porous soil, it is necessary that the surface water be removed; and under prevailing plans of construction this requires that the gutter at least be given sufficient grade to carry off the surface water. It would be theoretically possible to have all streets perfectly level and make the curbs in the form of a vertical grating behind which and below the roadway level would be a channel for carrying off the water, which channel could be given any slope desired. Or the roadway could be dished, and a sloping channel placed in the center and covered by a grating. Neither of these expedients has proved successful in the few cases in which they have been tried.

MINIMUM GRADES.

Theoretically any slope at all to a gutter will provide for removing surface water, but the flatter this slope the slower the flow and consequently the deeper the water.

Moreover, it is impracticable to make a gutter surface absolutely true to slope; and if it is very flat, minor depressions therein will cause the pooling of water. Consequently the rougher or more uneven the surface of the gutter, the steeper should be the minimum grade, as a general thing. The surface water will carry more or less suspended matter, some which will float but a considerable amount will be dirt and grit which will require some velocity for removing it. Depth of water is desirable to prevent the floating matter from stranding, and it is not generally desirable that the dirt be washed into the sewer; consequently from this point of view the velocity should not be made too great. The minimum grade which has been established by the Corps des Ponts et Chaussées for French streets is 0.8 per cent. The Troy Improvement Commission some years ago adopted 0.75 per cent. Flatter grades have been used for gutters in asphalt and wood block pavements. Seventh avenue, New York, has a grade of about 0.22 per cent continuing for 1½ miles above Central Park. Well laid brick gutters may have nearly as flat grades. We would suggest the following as the minimum grades which will give acceptable results: 0.25 per cent for asphalt or wood block; 0.25 to 0.50 per cent for brick or flag; 0.75 per cent for stone block; 1 per cent for cobble stones.

From the point of view of appearance, favorableness for traffic, and facility of construction, it is desirable to keep the form of crown of a roadway uniform throughout the length of a block, and this means giving the crown of the street the same slope as the gutter. The plan has been adopted in some cities, however, of making the roadway perfectly level at the crown and for about three-quarters of the distance toward the gutter, warping the remaining fourth of the surface next to the curb so as to provide for a gutter grade. Where this is done, the storm water inlets are usually placed at frequent intervals (say one at each corner and one in the center of each block), so as to reduce to a minimum the difference in level of the high and low points in the gutter.

MAXIMUM GRADES.

To confine the grades of gutters to a fixed maximum is very difficult if not impossible, and the elimination of the objectionable features of steep gutters is generally secured by some other methods, such as introducing dams or water-breaks in the gutter; giving the gutter a very uneven surface by using rough stone; laying the gutter in a series of alternate level stretches and drops, giving the effect of a flight of steps; and other expedients.

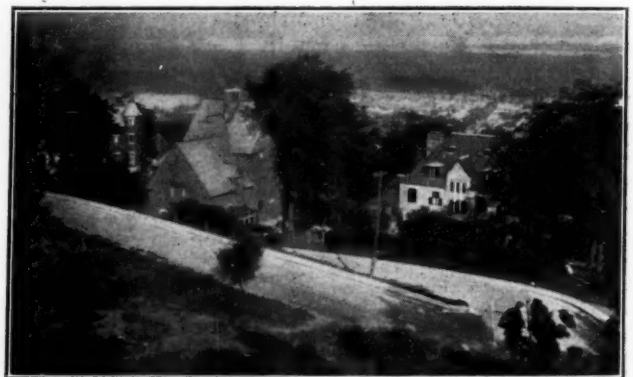
For traffic, the less the grade the less the energy or time required to travel a given distance. Therefore there is an actual saving of expense, in the form of either energy or time, in keeping street grades at a minimum. There is a certain amount of traction resistance due to axle friction and rolling resistance; the former depending to a considerable extent upon the construction of the wheels and bearings, the latter to the construction of the wheel, its width of tire and the nature of the roadway surface. Theoretically these two are constant, no matter what the grade; although tests seem to indicate that the grade has a slight affect upon the rolling resistance. Axle friction varies from about 1.2 per cent to 6 per cent of the load, the former for thimbleskein bearings with good lubricant, the latter for poorly constructed bearings without lubricant. For an ordinary well-constructed wagon, well lubricated, the friction may be taken as between 22 and 50 pounds per ton hauled. Numerous experiments have been made to determine by actual test the tractive resistance on level roads with various kinds of surfaces; that is, the total resistance from all causes except grade. These experiments indicate about the following: Asphalt, between 12 and 70 pounds per ton (this varies with temperature); brick, between 15 and 35; granite, between 25 and 80; best macadam, between 15 and 40; fair macadam, between 35 and 70; old macadam, 80 or more; ordinary dirt, about 200; loose sand, 300 or more. Grade resistance is equal to the grade percentage times the load. That is, on a 1 per cent grade the grade resistance is 20 pounds per ton; on a 2 per cent grade, 40 pounds, etc. This amount is to be added to the tractive resistance on a level to give the total tractive resistance, or the energy necessary to move the load.

There are other conditions affecting traffic resistance, such as the size of wheel and width of tire, the speed, etc. The width of tire would theoretically have no effect on a perfectly smooth and solid pavement, but on one which is compressible or irregular in surface it will have more or less affect. Doubling the speed seems to increase traction resistance by about one-third on macadam, less on smoother pavements and more on rougher. It requires from two to six times as much tractive force to start a vehicle as to keep it in motion on a level at a speed of two or three miles an hour.

The part of the above consideration which is most

important in this discussion is that referring to grade. Theoretically either horse or automobile should be able to climb any grade which is not too steep to permit the former to obtain a foothold or to furnish the latter sufficient friction between wheel and roadway. Practically, however, the grade may become so steep that a horse would not have sufficient energy to raise itself for a long, continuous stretch without drawing any load whatever. Moreover, the amount of load which either horse or automobile could draw would become so small for very steep grades that it might be uneconomical to endeavor to do any hauling over them. For instance, the grade resistance on a 20 per cent grade would be 400 pounds per ton, or say 425 pounds total tractive resistance on a fairly good, hard pavement. On a level, the resistance would be only 25 pounds and consequently require only 1-17 as much energy; or conversely, a given energy should be able to draw 17 times the load on the level that it does on a 20 per cent grade. Where there is any hauling to be done over a road, there is a money value which will last through all future time in reducing its grade; and ultimate economy would require a balancing of the cost of reducing grade (by cutting, filling or otherwise) against annual loss incurred by the additional tractive resistance of the steeper grade.

The problem also frequently offers another solution, that of reducing the grade by lengthening the route, either by winding or zigzagging up a hill, or in some



Courtesy, Barrett Co.

"HAIRPIN TURN" ON HILLSIDE STREET.
Belvidere Road, Westmount, P. Q.

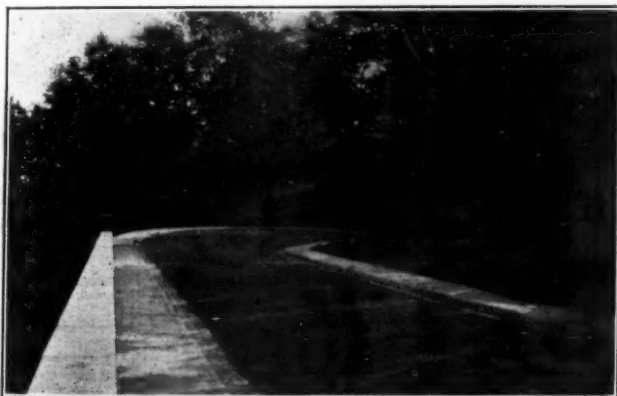
cases by passing around the hill through a valley or other depression. A certain amount of lengthening of road, because it permits heavier loads to be hauled or better time to be made, or both, may cause the longer road to be more favorable than the shorter and steeper one. This was discussed in an article entitled "Motor Trucks and Street Grades" which appeared in the issue of June 8th. Calculations given therein indicated that, for automobile trucks, there would be little advantage in making a detour to avoid a 3 per cent grade; an increase of length of road by as much as 75 per cent would be warranted where the grade was 6 per cent; while if the grade amounted to 8 or 10 per cent, a route $3\frac{1}{2}$ times as long would not consume any more time or energy. The roadway in each case was assumed to be paved with granite blocks offering a tractive resistance of 40 pounds per ton.

Where the roadway is less favorable to traffic, such as a macadam offering a tractive resistance of 60 to 100 pounds per ton, the advantage of the longer road would be less, or rather the length of detour which would be equally advantageous would be less. In planning streets, however, it should be assumed that ultimately, if not at present, the best kind of roadway surface will be constructed, and therefore, the problem of location should

be solved on the hypothesis of minimum resistance due to such surface.

It is apparent that it is largely a matter of judgment or of local conditions what shall be taken as a maximum grade. Where a city is located in a hilly country where almost all streets and roads have more or less grade and loads are customarily made lighter because of this, it would be justifiable to use steeper grades as a maximum than on the infrequent hills in a city where most of the streets were practically level. F. C. Thompson, Engineer of Highways of Bronx Boro, N. Y., has stated that he considers 3 per cent the steepest grade desirable for sheet asphalt and creosoted wood block; 6 per cent for asphalt block; 4 or 5 per cent for vitrified brick and 13 per cent for soft granite or Medina sand stone. Asphalt has been laid, however, on a 17 per cent grade in Pittsburgh, but is by no means recommended for such steep grades. Among steep street grades to be found in this country are the following: In San Francisco, 25½, 21½ and 18 per cent on Sacramento street; in Rochester, N. Y., 17.8 per cent; in Cincinnati, O., 16 per cent. New York city some years ago adopted 18 per cent as a maximum grade for its thoroughfares, and the Troy Improvement Commission adopted 7 per cent.

While these steep grades may be permissible for local streets or minor residence thoroughfares, where most of the traffic consists of carriages and light delivery wagons with only an occasional coal wagon or moving



Courtesy of Barrett Co.

TERRACE CONSTRUCTION ON A HILLSIDE STREET.
Bailey Road, Westmount, P. Q.

van, in or near transportation centers grades should not exceed 2 or 3 per cent, nor should they exceed 5 or 6 per cent in a business district, where it is possible to keep them down to these maximums by any care in planning or practicable cost of grading. In many cases excessive grading may be postponed until the traffic warrants or the money can be raised; but the final grade should be considered in laying out the plan, and the latter modified if necessary to keep the cost of the future grading at a minimum.

CONCRETE ROAD BUILDING IN NORWALK.

The author of the article bearing the above title which appeared in our issue of May 18th, C. A. Betts, calls our attention to an incorrect statement in that article which was due to our misunderstanding some data furnished by him and written by us to accompany the article. "Three barrows of stone per batch were furnished by six men, and two barrows of sand by a shoveler" should have read: "Four barrows of stone per batch were furnished by three barrow-men and six shovelers and two barrows of sand by two barrow-men and one shoveler." Also by a typographical error .49 inch was given as the cross-sectional area of reinforcement per foot width of pavement; this of course should have been .049.

EXPERIENCE WITH DIFFERENT KINDS OF PAVEMENTS.

During the past five years various types of experimental pavements have been constructed in New Jersey and conditions on these sections have been carefully observed by the Department of Conservation and Development. In his report for 1915, R. B. Gage, chemist to the Division of Geology of this department, states that, while many of these possess valuable qualities when laid by careful and experienced contractors, they are failures when constructed by average contractors. Experience has shown that the fewer the uncertain factors in a pavement—the more "fool-proof" it is—the fewer the failures due to improper construction. The few premature failures that have occurred during the past five years, particularly in the bituminous concrete pavements, have been mostly local and limited in extent, but they show the dangers arising from unskilled construction.

Mr. Gage states the following facts as definitely established:

1. Any bituminous concrete pavement of either the hot or cold-mixed grade, when properly constructed and laid on a suitable and well-drained base, will last at least five years, with very little repair, and from ten to fifteen years longer if properly repaired and maintained.
2. These pavements cannot be properly constructed by novices or even by experienced contractors unless they have the proper equipment and the necessary financial resources.
3. That it is false economy to award contracts to contractors who have not had the necessary experience or have not the required equipment or financial resources.
4. That hot-mixed bituminous concrete pavements are more difficult to construct than those of the cold-mixed method.
5. That the life of any bituminous concrete pavement is limited unless properly constructed.
6. That hot-mixed bituminous concrete pavements cannot be repaired as cheaply or conveniently as those of the cold-mixed method.
7. When properly constructed, a hot-mixed bituminous concrete pavement will, on the average, require less repairing during the first five years of its life than will a cold-mixed pavement.
8. That a comparatively soft bituminous pavement, having a low tensile strength, is superior to a brittle one with a high tensile strength.
9. That over 90 per cent of the early failures in bituminous pavements have been caused by faulty construction, unstable or improperly drained bases, and not by the use of inferior materials.
10. That a well-drained, old macadam road, if scarified and redressed with a layer of 1½-inch stone, can be kept in a satisfactory condition, even when subjected to fairly heavy travel, by frequently coating the surface with a liquid bituminous binder.
11. The cost of maintaining in proper condition such a repaired macadam road is not much in excess of the interest charge on the cost of an expensive bituminous concrete surface.
12. A Portland cement concrete road, if properly constructed, would seem to need but little repairing during the first five years of its life.
13. Such a pavement makes a very satisfactory surface for automobile travel, and is not as slippery in winter as a bituminous concrete pavement.
14. After such a pavement is no longer suitable as a surface, it can be used as a base for a bituminous or block pavement.
15. When a pavement is to be subjected to much automobile travel, the probable difference in durability be-

tween a Portland cement concrete road and a macadam road would seem to indicate that the former is more economical even if the initial cost is somewhat higher.

16. If a Portland cement concrete road is not uniform in composition, it is prone to develop pot-holes. Pavements of this kind are exceedingly hard to repair satisfactorily.

17. The sub-foundation for a Portland cement concrete road should be more carefully prepared and better drained than any other.

18. The application of a lignin binder to a gravel surface greatly prolongs the life of such a road. It prevents them from raveling during the dry season or becoming soft and impassable when the frost is leaving the ground.

WATER MAINS LAID DURING 1915*

Compiled from Information Furnished by Officials of More Than Six Hundred Plants—Length of Each Size and Kind Laid—Cost of Pipe and of Laying—Depth to Which Pipe Was Laid

City and State	Diameter, inches	Kind	Length, feet	Cost per ton	Cost of laying per foot	Depth laid
Montana:						
Billings	4	cast iron	3,796	\$35.00	\$0.58	4.5
	6	cast iron	12,314	34.00	.83	4.5
	8	cast iron	5,279	34.00	1.18	4.5
	10	cast iron	9,271	34.00	1.41	4.5
Glendive	4	cast iron	1,600	....	.775	6.5
Kalispell	18	cast iron	....	42.00	.80	4.5T
	18	wood	1,990	1.35 ^o	.33	4.5T
Nebraska:						
Fairbury	4	cast iron	700	28.00	.15	4.5
Hastings	4	cast iron	10,601	30.00	....	5M
Schuyler	6	cast iron	1,050	30.00	.31	4T
	8	cast iron	350	31.50	.50	4T
	10	cast iron	1,050	31.50	.57	4T
	12	cast iron	550	31.50	.63	4T
New Hampshire:						
Berlin	1½	wrought iron	140	132 ^s	.85 ^r	4.5-5T
	2	wrought iron	3,021	.177 ^s	.39 ^r	4.5-5T
	6	cast iron	928	22.20	.72 ^r	4.5-5T
Claremont	1¼-2	wrought iron	6,178	....	....	5T
	6	cast iron	1,829	25.00	....	5T
	12	cast iron	90	25.00	....	5T
Concord	6	cast iron	2,970	21.45	.75	4.5T
Dover	4	cast iron	1,296	25.34	.70 ^o	5.75M
Franklin	6	cast iron	1,500	....	1.00	5T
Keene	4	cast iron	124	25.20	.225	6T
	6	cast iron	1,424	23.84	.225	6T
	8	cast iron	1,080	22.84	.225	6T
Milford	4	cast iron	1,730	33.00	....	5B
	6	cast iron	326	30.00	....	5B
Newport	1¼	wrought iron	446	....	.25 ^o	5T
	6	cast iron	432	26.60	.50 ^o	5T
Pembroke	6	wood	10,514	.38 ^s	.20	4-5T
	8	wood	10,931	.50 ^s	.20	4-5T
	12	cast iron	120	....	1.50	4-5T
	12	wood	59,833	.73 ^s	.24	1-6T
	14	wood	6,552	.75 ^s	.35	4-7T
	16	wood	4,750	.81 ^s	1.75	5-11T
New Jersey:						
Bridgeton	6	cast iron	1,700	23.00	.795	4T
Dover	4	cast iron	200	24.00	.25	4.5T
	6	cast iron	900	24.00	.30	4T
	10	cast iron	300	24.00	.35	4T
Irvington	4	cast iron	451	22.10	.58 ^s	4.5T
	6	cast iron	3,000	20.10	.76 ^s	4.5T
	8	cast iron	1,700	19.70	.98 ^s	4.5T
Jersey City	6	cast iron	1,440	20.00	.35 ^s	4T
	8	cast iron	10,887	20.00	.44 ^s	4T
	12	cast iron	4,013	20.00	.50 ^s	4T
	20	cast iron	2,822	....	4.07 ^s	4T
	60	steel	246	....	10.86 ^s	4T
Perth Amboy	6	cast iron	3,264	....	....	....
	12	cast iron	4,200	....	....	....
Pleasantville	4	cast iron	2,715	28.35	.50	4B
	6	cast iron	1,240	25.35	.60	4B
Rahway	2	wrought iron	2,844	1221	1.01 ^s	3B
	6	cast iron	493	.465	.177 ^s	4B
Ridgewood	6	cast iron	1,609	....	....	4T
	8	cast iron	46	....	....	4T
South Orange	4	cast iron	1,059	25.50	.24 ^o	5.5B
	6	cast iron	2,838	24.45	.28 ^o	5.25B
	10	cast iron	1,464	23.00	.38 ^o	5B
Trenton	4	cast iron	9,882	24.00	.55	4.5
	6	cast iron	16,203	24.00	.70	4.5
	8	cast iron	3,679	24.00	1.10	4.7
	10	cast iron	24	24.00	1.30	4.8
	20	cast iron	2,335	24.00	3.37	5.7
Verona	6	cast iron	300	27.50	.46	4B
Wallingford	4	cast iron	250	....	1.20	5B
	6	cast iron	350	28.00	1.15	4B
West Orange	4	cast iron	8,101	....	.621	4.5B
	6	cast iron	588	....	.641	4.5B
New York:						
Beacon	6	cast iron	5,600	23.50	.74 ^o	4T
Brooklyn	6	cast iron	5,700	23.00	1.50	4T
	8	cast iron	54,300	23.00	1.75	4T
	12	cast iron	5,500	23.00	2.75	4T
	20	cast iron	1,600	23.00	4.50	4T
Corning	4	cast iron	1,658	22.10	.34	6B
Cortland	6	cast iron	2,038	23.20	.171	4T
	8	cast iron	2,008	23.20	.252	4T
Dansville	4	wrought iron	400	.14 ^o	.25	5
	6	cast iron	900	27.75	.35	5
Elmira	2	wrought iron	1,067	....	....	....
	6	cast iron	7,362	23.00	.66 ^s	5B
	8	cast iron	2,860	23.00	1.00 ^s	5B

For footnotes, see page 868.

*Continued from page 830.

Water Mains Laid During 1915 (Continued).

City and State	Diameter, inches	Kind	Length, feet	Cost per ton	Cost of laying per foot	Depth laid
New York (Continued):						
Fort Plain	4	cast iron	100	.....	\$1.00	5
Frankfort	4	cast iron	800	\$22.00	.35 ^e	5T
Glens Falls	6	cast iron	700	22.00	.35 ^e	5T
Hoosick Falls	4	cast iron	51	24.00	.68	4T
Jamestown	6	cast iron	1,503	24.00	.62	5T
.....	1½	wrought iron	680	.....	.18	5E
.....	1	wrought iron	671	.....	.15 ^e	4.5T
.....	2	wrought iron	17,027	.....	.15 ^e	4.5T
.....	4	cast iron	59	22.10	.30 ^e	4.5T
.....	6	cast iron	7,501	22.10	.34 ^e	4.5T
.....	8	cast iron	1,656	22.10	.45 ^e	4.5T
Johnstown	¾	wrought iron	350	.....	.....	5B
.....	4	cast iron	1,319	26.00	.754	5B
.....	6	cast iron	1,712	24.00	.882	5B
Lancaster	4	cast iron	1,200	25.00	.18	4.5T
.....	6	cast iron	400	26.00	.18	4.5T
Little Falls	4	cast iron	500	24.75	.....	4.5B
.....	6	cast iron	620	24.75	.....	4.5B
Malone	4	cast iron	679	23.00-32.00	.60	5.5B
Mt. Vernon	3	wrought iron	320	.....	.....	3.5T
.....	4	cast iron	150	.....	.....	3.5T
.....	6	cast iron	11,392	.....	.....	3.5T
Newburgh	6	cast iron	4,284	23.50	1.00	5B
Oswego	6-10	cast iron	31,260	23.84	.....	4
Peekskill	4-20	cast iron	4,000	25.00	.40	4
Plattsburgh	6	cast iron	4,000	.50 ^e	.....	5T
.....	12	cast iron	1,400	33.00	.....	4.5T
Port Jervis	4	cast iron	47	23.00	7.55 ⁴	5B
.....	6	cast iron	266	21.50	.825 ⁴	5B
Poughkeepsie	8	cast iron	520	22.40	1.0375 ⁴	5B
Salamanca	8	cast iron	3,456	24.50	1.15 ⁴	5.2B
.....	1	wrought iron	225	.....	.15	4
.....	1½	wrought iron	192	.....	.15	4
.....	4	cast iron	4,778	24.00	.25	4
.....	6	cast iron	15,141	24.00	.25	4
.....	8	cast iron	2,781	24.00	.30	4
Schenectady	18	cast iron	4,737	21.00	1.00	5
.....	4	cast iron	7	.....	.....	5T
.....	6	cast iron	13,913	21.75	.....	5T
.....	8	cast iron	1,139	.....	.....	5T
.....	12	cast iron	46	22.70	.....	5T
.....	18	cast iron	16	.....	.....	5T
.....	24	cast iron	1,172	.....	.....	5T
.....	36	cast iron	810	.....	.....	5T
Seneca Falls	1½	wrought iron	1,172	.....	.35 ⁴	4.5T
.....	12	cast iron	647	22.00	2.75 ^e	4.5T
Sidney	10	cast iron	756	.....	1.20 ²	4T
Solvay	4	cast iron	900	24.00	.35	4.5B
Tarrytown	6	cast iron	565	24.65	.51	5B
Tonawanda	10	cast iron	1,270	24.00	1.30 ^e	4T
Wappingers Falls	6-8-10	cast iron	40,000	23.00	.20	4.5T
Waterloo	1½	cast iron	145	.....	.....	.....
.....	2	cast iron	1,025	.....	.....	.....
.....	4	cast iron	1,819	.....	.....	.....
.....	6	cast iron	6,471	.....	.20	4B
Waverly	4	cast iron	778	24.65	.30 ^e	5T
Yonkers	6	cast iron	6,003	23.92	6.50 ^e	4T
.....	8	cast iron	24,656	23.92	6.50 ^e	4T
.....	30	cast iron	1,000	.....	14.00 ^e	4T
North Carolina:						
Rocky Mount	1½	wrought iron	1,000	.091 ^e	.05	1.5T
Salisbury	6	cast iron	900	23.50	.10	2.5T
.....	6	cast iron	1,200	26.50	.....	3
North Dakota:						
Bismarck	6	cast iron	900	31.50	.825 ⁴	7.5
Mandan	4	cast iron	8,500	32.00	.75 ^e	6.5T
Williston	4	cast iron	500	37.00	.50	8.5T
Ohio:						
Ashland	4	cast iron	6,500	24.50	.50	4
.....	6	cast iron	500	23.50	.75	4
Barberton	4-6-8	cast iron	15,800	23.75-25.75	.34	4.5
Bellefontaine	1½	wrought iron	600	.....	.....	4
.....	4	cast iron	2,426	.....	.....	4
Cleveland	8	cast iron	98,753	23.75	1.242 ^e	6T
.....	10	cast iron	17,549	23.75	1.425 ^e	6T
.....	12	cast iron	4,050	23.75	1.932 ^e	6T
.....	16	cast iron	16,507	23.75	2.130 ^e	6T
.....	20	cast iron	17,108	23.75	2.875 ^e	3.5T
.....	24	cast iron	837	23.75	4.662 ^e	3.5T
.....	30	cast iron	3,999	23.75	6.092 ^e	3.5T
.....	36	cast iron	8,406	23.75	8.103 ^e	3.5T
.....	42	cast iron	7,438	23.75	11.044 ^e	3.5T
.....	48	cast iron	7,969	23.75	14.517 ^e	3.5T
Columbus	48	cast iron	2,987	23.75	16.513 ^e	3.5T
.....	4	cast iron	811	21.50	.75	3.5T
.....	6	cast iron	14,734	21.50	.85	3.5T
.....	8	cast iron	22,230	21.50	1.09	3.5T
.....	20	cast iron	10,242	21.50	3.05	3.5T
.....	24	cast iron	7,558	21.50	5.00	3.5T
Coshocton	6	cast iron	3,220	23.00	.19	5
.....	8	cast iron	500	23.00	.29	5
Cuyahoga Falls	1-1½	wrought iron	3,500	.....	.18-32	4B
.....	4	cast iron	1,926	24.90	.6625 ^e	4B
Dayton	4	cast iron	1,504	20.40	.....	.....
.....	6	cast iron	24,414	20.40	.....	.....
.....	8	cast iron	5,133	20.40	.....	.....
.....	10	cast iron	19,006	20.40	.....	.....
.....	12	cast iron	5,927	20.40	.....	.....
.....	16	cast iron	15,760	20.40	.....	.....
.....	18	cast iron	136	20.40	.....	.....
.....	20	cast iron	9,876	20.40	.....	.....
.....	24	cast iron	6,177	20.40	.....	.....
.....	30	cast iron	4,860	20.40	.....	.....
.....	36	cast iron	2,390	20.40	.....	.....

For footnotes, see page 868.

Water Mains Laid During 1915 (Continued).

City and State	Diameter, inches	Kind	Length, feet	Cost per ton	Cost of laying per foot	Depth laid
Ohio (Continued):						
Delaware	6	cast iron	600	\$24.00	\$0.28	4
East Cleveland	4	cast iron	433	....	.90 ⁰	6T
	6	cast iron	24,817	....	1.00 ⁰	6T
	16	cast iron	13,970	....	....	4.5T
Eaton	4	cast iron	1,500	24.90	.45	4
Girard	4	cast iron	500	24.80	.45	4T
Granville	1½	wrought iron	1,500	....	.17	4M
Hamilton	2	wrought iron	1,444	....	....	3.5B
	4	cast iron	1,507	24.75	....	3.5B
	6	cast iron	4,912	23.50	.75	4.25B
	8	cast iron	2,650	21.70	1.10	4.25B
	16	cast iron	5,519	20.50	1.25	4.25B
Lancaster	6	cast iron	3,100	25.45	....	4.5B
Logan	4-12	cast iron	3,000	22.75	.45	3T
Marion	6	cast iron	8,370	....	....	4.5T
	8	cast iron	5,741	....	....	4.5T
Massillon	1-2	wrought iron	2,535	....	.22-28 ⁴	4.5T
	4	cast iron	142	24.50	.52 ⁴	4.5T
	6	cast iron	4,452	22.50	.68 ⁴	4.5T
Medina	4	cast iron	12,500	24.00	.56	3.5B
Middletown	6	cast iron	4,506	22.22	.21 ⁵	3.5T
	8	cast iron	1,117	22.15	.48 ⁵	3.5T
	12	cast iron	1,026	22.15	.51 ⁵	3.5T
	16	cast iron	5,564	22.15	.695 ⁵	3.5T
Mt. Vernon	4	cast iron	8,000	22.50	.25 ⁵	4T
Niles	4	cast iron	200	21.90	....	4.5
	6	cast iron	5,190	21.90	....	4.5
	8	cast iron	1,600	21.90	....	4.5
Sandusky	6	cast iron	3,340	23.50	1.25	4.5T
	12	cast iron	600	23.50	1.50	4.5T
Sidney	4	cast iron	1,400	....	.16 ⁷	4
	6	cast iron	600	....	.18 ⁷	3.5
Tiffin	3	cast iron	820	31.00	.25	4.5T
	4	cast iron	1,997	25.00	....	4.5T
	6	cast iron	8,133	23.27	....	4.5T
	8	cast iron	321	23.27	....	4.5T
	10	cast iron	10	23.27	....	4.5T
	12	cast iron	195	23.27	....	4.5T
Toledo	4	cast iron	2,351	25.27	.677 ⁰	4
	6	cast iron	32,679	21.65	.783 ⁰	4
	8	cast iron	2,708	21.65	.928 ⁰	4
	12	cast iron	400	21.65	1.52 ⁰	4
	24	cast iron	678	22.35	3.96 ⁰	4
	30	cast iron	494	22.35	9.77 ⁰	4
Toronto	¾	wrought iron	113	....	....	..
	1	wrought iron	647	....	....	..
	1½	wrought iron	325	....	....	..
	2	wrought iron	35	....	....	..
	4	cast iron	1,154	....	....	..
Troy	4	cast iron	670	24.00	.30	4.5
	6	cast iron	420	22.00	.30	4.5
Urbana	4	cast iron	2,300	26.00	.175 ⁵	4M
Warren	¾-1½	wrought iron	954	.06-12 ⁵	.19-25	4.5T
	4	cast iron	615	30.00	.70	4.5T
	6	cast iron	13,461	30.00	.85	4.5T
	8	cast iron	1,104	30.00	1.00	4.5T
Washington Court House.....	6	cast iron	850	22.80	.80	4B
Oklahoma:						
McAlester	4	cast iron	2,000	30.00	.20	2
Muskogee	6	cast iron	991	....	.16	3
Stillwater	4	cast iron	1,000	33.00	.25	2.5T
Oregon:						
Eugene	4	steel	1,500	.32 ⁰	.18	3
	6	steel	500	.49 ⁰	.22	3
Marshfield	8	cast iron	3,200	32.00	.65 ⁴	3.2B
Pennsylvania:						
Allentown	6	cast iron	1,850	....	.36 ⁵	4.25B
	8	cast iron	4,450	....	.40 ⁵	4B
	12	cast iron	5,000	....	.44 ⁵	4B
Aspinwall	2	wrought iron	416	49.93	.157 ¹¹	4.5B
Barnesboro	4	cast iron	1,750	28.00	.47	4B
	6	cast iron	2,000	28.00	.60	4B
	8	cast iron	1,700	28.00	.70	4B
Carbondale	6	cast iron	6,000	....	....	..
	8	cast iron	2,800	....	....	..
	10	cast iron	1,400	....	....	..
	12	cast iron	1,200	....	....	..
	14	cast iron	750	....	....	..
Chambersburg	4	cast iron	1,592	24.70	.625	4T
Chester	4-30	cast iron	100 miles	24.38	.82-4.25	4
Duquesne	2	wrought iron	33,412	.10 ⁶	.30	3B
	3	wrought iron	250	.15 ⁶	.30	3B
	4	cast iron	77,163	22.50	.36	3B
	6	cast iron	2,956	22.00	.36	3B
	8	cast iron	12,136	22.00	.38	3B
	10	cast iron	6,079	21.00	.42	3B
	14	cast iron	6,925	20.00	....	4B
Elizabethtown	4	cast iron	684	27.80	.43	3.5T
Gettysburg	12	cast iron	625	24.15	2.00	3T
Greensburg (and vicinity).....	4	cast iron	3,945	23.60	.67 ⁰	3.5T
	6	cast iron	6,806	21.75	.81 ⁰	3.5T
	8	cast iron	408	21.60	1.00 ⁰	3.5T
	10	cast iron	60	21.25	1.40 ⁰	3.5T
Harrisburg	6	cast iron	8,555	21.18	....	3.5T
	8	cast iron	1,038	21.18	....	3.5T
	10	cast iron	1,154	21.18	....	3.5T
	12	cast iron	1,974	21.18	....	3.5T
Indiana	1	wrought iron	1,000	....	....	..
	4	cast iron	1,500	23.00	....	3-4
	6	cast iron	650	25.00	....	..
Juniata	4	cast iron	1,500	22.50	.18 ⁷	3B
	8	cast iron	400	22.50	.25 ⁷	3B
	12	cast iron	12,750	22.50	.31 ⁷	3B
Lancaster	6	cast iron	3,600	24.50	1.51	2.75

For footnotes, see page 868.

Water Mains Laid During 1915 (Continued).

City and State	Diameter, inches	Kind	Length, feet	Cost per ton	Cost of laying per foot	Depth laid
Pennsylvania (Continued):						
Lehighton	4	cast iron	400	\$26.60	\$0.72	4T
Media	6	cast iron	240	23.95	.80	4T
Minersville	4	cast iron	1,000	25.50	.58 ^a	4T
Norristown	4	cast iron	300	....	....	3.5T
Pittsburgh	8	cast iron	681	....	....	3.5T
	14	cast iron	850	20.32	....	3.5T
	6	cast iron	1,200	24.00	.97 ^a	4.5T
	4	cast iron	851	23.00	1.096	3T
	6	cast iron	18,994	23.00	1.223	3T
	8	cast iron	33	23.00	4.524	3T
	10	cast iron	484	23.00	2.581	3T
	12	cast iron	2,601	23.00	2.636	3T
	16	cast iron	3,437	23.00	3.297	3T
	18	cast iron	30	23.00	22.340	3T
	20	cast iron	2,277	23.00	4.721	3T
	24	cast iron	3,574	23.00	5.571	3T
	30	cast iron	4,342	23.00	8.023	3T
	36	cast iron	1,378	23.00	13.169	3T
	42	cast iron	343	23.00	19.821	3T
Reading	6	cast iron	5,756	20.50	.28	4.5
	8	cast iron	859	20.05	.35	4.5
	10	cast iron	414	20.05	.30	4.75
	12	cast iron	1,855	20.05	.34	5
	20	cast iron	460	20.05	.50	5.5
Sewickley	4	cast iron	437	....	....	4.5T
	6	cast iron	5,237	....	....	4.5T
	8	cast iron	8,439	21.80	.18 ⁷	4.5T
Susquehanna	4	cast iron	90	25.00	.75	4.5
	10	cast iron	4,750	21.00	.95	4.5
Rhode Island:						
Bristol	2	wrought iron	2,274	....	.35	..
	6	cast iron	4,715	....	.70	..
East Providence	4-6	cast iron	....	24.00	.36	5T
Providence	6	cast iron	28,546	20.50	.56 ^a	4.7M
	8	cast iron	11,259	20.50	.75 ^a	4.7M
	12	cast iron	16,867	20.20	1.16 ^a	4.7M
	16	cast iron	4,491	20.20	1.75 ^a	4.7M
	24	cast iron	71	20.20	3.26 ^a	4.7M
	30	cast iron	29	20.20	4.65 ^a	4.7M
	36	cast iron	33	20.20	6.25 ^a	4.7M
Westerly	6	cast iron	3,476	26.34	.74 ¹	4.5B
Woonsocket	6	cast iron	5.50	25.00	1.68 ^a	6B
	8	cast iron	2,100	25.00	1.30 ^a	6B
	12	cast iron	1,580	25.00	1.57 ^a	6B
	8 ¹²	cast iron	2,730	25.00	1.43 ^a	6B
	12 ¹²	cast iron	5,030	25.00	2.44 ^a	6B
South Carolina:						
Clinton	4	cast iron	2,000	....	....	2.5T
	6	cast iron	29,605	21.65	.53 ^a	3.5T
Columbia	8	cast iron	2,250	21.65	.70 ^a	3.5T
	10	cast iron	12,611	21.65	.92 ^a	3.5T
	12	cast iron	5,243	21.65	1.16 ^a	3.5T
Orangeburg	6	cast iron	1,300	23.10	1.16 ^a	2.5T
	10	cast iron	600	27.10	....	2.5T
South Dakota:						
Aberdeen	4	cast iron	2,900	28.60	.60 ^a	5.5
	6	cast iron	1,240	28.60	.95 ^a	5.5
	12	cast iron	932	28.60	2.20 ^a	5.5
Brookings	4	cast iron	1,530	30.00	.42	7T
	6	cast iron	410	29.00	.48	7T
Mitchell	4	cast iron	380	31.20	.84 ^a	6T
	6	cast iron	540	29.20	.93 ^a	6T
	8	cast iron	435	29.20	....	6T
Redfield	10	cast iron	1,700	27.00	.45 ⁷	6.5B
Tennessee:						
Clarksville	4	cast iron	600	26.00	.575	2.5T
	6	cast iron	1,300	24.00	.665	2.5T
Dyersburg	6	cast iron	2,503	22.95	.70 ^a	4T
Greenville	4	....	582	23.80	.68	2.5
Humboldt .....	..	wrought iron	3,500	.06 ^a	.03	2M
Memphis	4	cast iron	901	21.50	.20 ^a	4B
	6	cast iron	28,305	20.50	.215 ^a	4B
	10	cast iron	273	20.50	.325 ^a	4B
	12	cast iron	1,642	20.50	.33 ^a	4B
Murfreesboro	4-2 1/2	wrought iron	5,182	....	.025	1.5
Tullahoma	1 1/4	wrought iron	1,000	.11 ^a	....	2T
	4	cast iron	300	30.00	.09 ^a	2T
Texas:						
Austin	1-2	wrought iron	46,471	....	....	..
	4	cast iron	5,411	....	....	..
	6	cast iron	6,735	....	....	..
	8	cast iron	614	....	....	..
	10	cast iron	114	....	....	..
Corsicana	4	cast iron	2,700	36.00	.12	2
	6	cast iron	1,200	36.00	.12	2
Longview	2	wrought iron	2,000	....	.23 ^a	2B
Plainview	4	cast iron	1,100	33.00	.25 ^a	2T
Seguin	4	cast iron	828	31.70	....	..
	6	cast iron	12	31.70	.45	1.5T
Waxahachie	4	cast iron	7.87 mile	31.00	.48 ^a	2T
	6	cast iron	.07 mile	31.00	.48 ^a	2T
Utah:						
Salt Lake City	4	cast iron	14	32.50	....	4B
	6	cast iron	51,938	32.50	1.4792	4B
	8	cast iron	867	32.50	average	4B
	12	cast iron	7,188	32.50	....	4B
Vermont:						
Barre	2	wrought iron	342	....	....	5.5B
	4	cast iron	1,990	27.50	....	5.5B
	6	cast iron	550	25.00	....	5.5B
Bennington	4	cast iron	600	27.00	.75	4.5T
Burlington	4	cast iron	3,773	....	1.15 ^a	6B
Fairhaven	2	wrought iron	500	25.75	.59 ^a	5.5B
	4	cast iron	975	.13 ^a	....	5.5B
Northfield	6	cast iron	423	25.90	.71	5.5T

For footnotes, see page 868.

Water Mains Laid During 1915 (Continued).

City and State	Diameter, inches	Kind	Length, feet	Cost per ton	Cost of laying per foot	Depth laid
Virginia:						
Marion	4	cast iron	400	27.00	.30	2.5T
Martinsville	4	cast iron	1,800	24.20	.12	3.5
Fulaski	4-12	cast iron	5,000	25.00	.15	2T
Winchester	4	cast iron	240	24.00	.60 ⁴	4B
Washington:						
Bellingham	1	wrought iron	2,550	.056 ⁶	....	2.5
	2	wrought iron	3,657	.18 ⁸	....	2.5
	2	wood	455	.12 ⁸	....	2.5
	4	wood	455	.19 ⁸	....	3
	4	cast iron	4,280	30.00	....	3
	6	cast iron	12,981	29.00	....	3
	8	cast iron	3,612	29.70	....	3
	10	cast iron	264	28.00	....	4
Chehalis	4	wood	15,840	....	.13	3
	6	wood	47,520	....	....	3
	8	wood	15,840	....	....	3
	10	wood	7,560	....	....	3
	14	wood	94,320	....	....	3
Dayton	2	wrought iron	1,000	.18 ⁸	.03 ⁸	2.5T
	4	wrought iron	600	.49 ⁸	.045 ⁸	2.5T
Gold Bar	4	wood	420	....	.14	2T
Hoquiam	1	wrought iron	263	....	....	2
	1 1/4	wrought iron	1,281	....	.067 ⁷	2
	1 1/2	wrought iron	231	....	....	2
Port Townsend	4	wood	1,172	.1925 ⁸	.31 ⁸	2
Pullman	2	wrought iron	3,000	65.00	.075	3B
	4	cast iron	2,000	21.00	.1125	3.75B
Spokane	6	kalamein	9,994	....	....	4
	6	cast iron	6,829	....	....	4
	10	cast iron	447	....	....	4
Tacoma	6	wood	2,490	....	....	4B
	6	cast iron	1,953	31.00	.10 ⁸	4B
	12	cast iron	2,210	31.00	.18 ⁸	4.5B
Tekoa	3/4-2	wrought iron	550	.07-18 ⁸	.10-14 ⁸	4B
	4	kalamein	780	.47 ⁸	.16 ⁸	4B
	10	cast iron	250	55.00	.90 ⁸	4.5B
Winlock	4	wood	2,000	....	.45 ⁹	3T
	8	wood	500	....	.65 ⁹	3T
West Virginia:						
Mannington	6	wrought iron	2,910	.522 ⁸	.12	3
Martinsburg	1 1/2-2	wrought iron	590	....	....	2T
	4	cast iron	1,475	....	.59 ⁴	2T
Wisconsin:						
Antigo	2	wrought iron	1,343	....	....	6T
	4	cast iron	30	27.50	.30 ⁸	6T
	6	cast iron	1,304	27.50	.36 ⁸	6T
Columbus	6	cast iron	1,300	25.50	.28	6B
Eau Claire	4	cast iron	2,745	28.00	.367	6.5T
	6	cast iron	4,298	26.00	.367	6.5T
	8	cast iron	558	26.00	.407	6.5T
	10	cast iron	965	26.00	.407	6.5T
Green Bay	6	cast iron	4,956	23.50	....	6
Janesville	4	cast iron	2,511	25.68	.32	6T
	6	cast iron	935	23.68	.487	6T
Jefferson	4	cast iron	2,956	26.30	.27	6T
	6	cast iron	5,058	28.50	.2475	6T
Kaukauna	6	cast iron	700	24.00	.32	6T
La Crosse	6-24	cast iron	69 miles	30.62	1.00	7T
Lake Geneva	6	cast iron	500	29.00	.30	5.5B
Madison	4	cast iron	1,359	23.78	.25	5.5T
	6	cast iron	12,425	22.78	.30	5.5T
	8	cast iron	1,670	22.78	.36	5.5T
Marshfield	6	cast iron	5,000	26.50	.237	6B
Milwaukee	4	cast iron	248	22.75	.32 ⁴	6B
	6	cast iron	56,448	22.75	.32 ⁴	6M
	8	cast iron	1,066	22.75	.32 ⁴	6M
	12	cast iron	7,475	22.75	.37 ⁴	6M
	20	cast iron	5,418	22.75	.52 ⁴	6M
Mineral Point	4	cast iron	782	25.00	1.00 ⁴	6M
New London	4	cast iron	600	....	1.00	5.5T
	6	cast iron	60	27.00	.15	6.3
Port Washington	4	cast iron	3,300	24.15	.18	6.3
Richland Center	8	cast iron	100	....	....	6T
	4	cast iron	2,742	26.95	.13	6B
	6	cast iron	2,412	24.95	.14	6B
Shawano	4	cast iron	450	....	.55	....
	6	cast iron	1,560	....	....	....
Sparta	4	cast iron	2,925	25.15	.23 ¹¹	6.5T
Two Rivers	4	cast iron	680	26.53	.28	5T
	6	cast iron	4,700	25.53	.30	5T
Watertown	4	cast iron	1,383	....	.69 ⁹	6T
	6	cast iron	2,649	....	1.13 ⁹	6T
Waupaca	1-1 1/4	wrought iron	700	....	.25	6.5
West Bank	4	cast iron	24	25.16	.30 ⁸	6B
	6	cast iron	1,126	23.16	.30 ⁸	6B
Wyoming:						
Laramie	6	cast iron	822	30.75	.18 ⁸	4.5T
	8	cast iron	716	30.75	.19 ⁸	4.5T
	10	cast iron	2,160	30.75	.22 ⁸	4T
	12	cast iron	1,080	30.75	.19 ⁸	4T
	14	cast iron	8,600	30.75	.20 ⁸	3T
	16	cast iron	15,383	30.75	.21 ⁸	3T
Canada:						
Toronto	6	cast iron	53,008	40.00	.34 ⁴	5.5T
	12	cast iron	57,104	38.15	.48 ⁴	5.5T
	20	cast iron	826	30.50	1.98 ⁴	4.5T
	24	cast iron	1,072	32.50	1.45 ⁴	4.5T
	30	cast iron	36	32.00	3.50 ⁴	4.5T
	30	cast iron	13,382	32.00	2.78 ⁴	4.5T

B—Measured to bottom of pipe; M—measured to middle of pipe; T—measured to top of pipe; 1—includes everything but pipe; 2—includes labor and pipe only; 3—includes lead and labor only; 4—includes cement or lead, labor, yarn and pipe; 5—includes cement or lead, yarn and labor; 6—per foot; 7—includes labor only; 8—includes labor and replacing pavement; 9—includes everything; 10—abnormal conditions, such as rock excavations, make these figures unfit for comparison; 11—includes labor, replacing pavement and pipe; 12—re-laid or replacing small pipe; 13—total cost.

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Subscribers are requested to notify us of changes of address, giving both old and new addresses.

Contributions suitable for this paper either in the form of special articles or of letters discussing municipal matters, are invited and paid for.

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JUNE 22, 1916

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Transporting Concrete Through Pipes.

In the June 8th issue, in the description of the Wilson Avenue intake tunnel, it was stated that concrete for lining the tunnel was sent through 700 feet of 8-inch steel pipe by compressed air, being sent directly from the mixer to behind the lining forms, without any handling whatever. In this issue further description of this method is given and its application to lining a large sewer.

The use of compressed air in this way would seem to be more expensive than a revolving mixer feeding into a chute through which the concrete flows directly to the work. But for tunnel work or other concreting where the point of deposit is not accessible from the surface but would ordinarily be reached by cars run on a construction track, this method of forcing the concrete through pipes, which can be carried almost anywhere and for distances up to a thousand feet, seems to offer special advantages. This method of placing concrete in the narrow space between a form and a tunnel wall would also seem to be simpler, more expeditious and probably cheaper than throwing it in by shovel.

In brief, while there are many ordinary conditions under which the more familiar methods are probably better, this method can probably be used to advantage in sewer and aqueduct tunnels and under other conditions of inaccessibility.

Standard Paving Units.

The standard units of the American Society of Municipal Improvements for street paving and for sewers were given in our issue of June 8th, together with an argument in favor of adopting them. An effort was made to define the units as concisely and clearly as possible, and these definitions were printed on cards and distributed to all city and town engineers whose names were known. Any who did not receive such cards can obtain them on application.

In order that the meaning of the units may be made perfectly clear, perhaps fuller explanations may be desirable. And first it may be said that the units were confined to a few features common to practically all work. This for two reasons—that it was believed that the simpler and fewer the units, the more general would be their adoption; and that these were perhaps the only units which would enter generally into comparison between cities; and for work not so entering, each city could adopt its own units.

"Pavement" is defined as "the wearing surface down to the base, if any." In an asphalt pavement this includes wearing and binder course. In a brick, stone or wood block pavement, the brick or block and sand or mortar cushion. In pavements like concrete or macadam, which have no base, the entire pavement to sub-grade is included.

A number of cities include the base with the top and may not wish to change; in which case this may be described as "pavement and base," but not as "pavement."

The reason for separating the two was that an increasing number of pavements on concrete base is being resurfaced on the old base; and this separation permits a comparison of cost of this repaving with the paving proper on a new base, and avoids confusion and uncertainty as to whether what is reported as "paving" does or does not include a new base. Also the thickness of base varies between cities and between different streets of the same city, and no true comparison can be made unless the thickness of base is known and allowed for, and this can be done most readily by considering the base separately.

Where the pavement is of a material, such as asphalt, concrete, macadam, etc., which may be of different thicknesses, the thickness should be stated. Where there is a standard thickness, as a brick, wood block or stone block, this is not necessary.

Naming the material and amount of the base would seem to define this, especially if the proportioning of the concrete be given. Thus a "6-in. 1:3:6 concrete base" could hardly be made more definite without a long explanation. Some have preferred giving the cubic yards of concrete rather than the area and thickness, but there are two arguments in favor of the latter. To a certain extent the cost per cubic yard varies with the area covered, since this determines the frequency of moving the mixer or distance the concrete is wheeled from the mixer, and also the area of surface to be smoothed off. Given area in square yards and thickness, and a minute's calculation enables an engineer to reduce this to cubic yards. But (and this is the second argument) the figures are for the information of city officials and tax payers, and if the cost per square yard of base is given, these can obtain the total cost by simple addition to the cost of pavement; while few would find it a simple matter to obtain such result if required to reduce cost per cubic yard (which means little to them) to cost per square yard.

Excavation is perhaps the most variable quantity occurring in most original paving work. It may vary

from nothing to several feet, and should *always* be separated from pavement and base construction. Comparison of excavation costs is desirable, but is of less importance than the absolute elimination of their effect upon the cost of pavement and base.

That curb, gutter and sidewalk should not be included in work designated as "pavement" would seem to need little argument. These units will be discussed next week.

MAKING TIGHT SEWER JOINTS.

Editor, Municipal Journal,
50 Union Square, New York City:

Dear Sir:—In your issue of May 18th the subject "Leakage in Sewers" has been given considerable attention. There are several interesting features of this question which have been discussed generally, but the real value that might be derived from reading these articles is lessened by the failure of the writer to mention his practice and to state how his specifications cover the subjects and what he personally recommends to overcome leakage in terra cotta pipe sewers and those constructed of brick or concrete.

It is not the aim of the writer of this article to advertise any particular product, but the experience gained under some adverse conditions may be of interest. Then again the question arises—how much additional cost per foot is justified to obtain water-tight work?; by which I mean reducing the seepage of ground water in sewers to a minimum.

In almost every separate system of sewers the number of feet of 8-inch pipe exceeds all other sizes many times, so that the question of how much additional cost per foot is justified over the price bid for laying terra cotta pipe with cement joints, to obtain a minimum amount of seepage, is a "live one." If it becomes necessary to lay a 6-inch terra cotta underdrain and surround it with broken stone and insist upon continual pumping from sumps, the cost for waterproofing becomes almost as great as the first cost of the pipe in dry soil, and this cost can be so advanced by various precautions taken to prevent seepage as would permit the laying of cast iron pipe. This cost for most towns is prohibitive although there are some conditions where the extra expense of laying cast iron pipe would be justifiable.

The writer has seldom gone to the expense of using an underdrain under a terra cotta pipe whose diameter is less than 12 inches, as it is his belief that with the proper care an 8-inch and 10-inch pipe can be made so tight, with the proper inspection during construction, at a less expense and obtain results that are satisfactory even when the terra cotta pipe is subjected to a head of 8 to 10 feet.

The practice of engineers varies; some believe in using a combination of tars, asphalts, or rubberized elastic compounds for joints; others sand and sulphur, but in most cases cement mortar, because of its smaller cost.

For large sewers an underdrain, if the soil is wet, is an absolute essential; and this may be considered true in trying to obtain water-tight work for sewers as small as 15 inches in diameter.

For sewers 12 inches in diameter and less the writer believes that satisfactory work can be obtained with less expense by using special pipe jointing material and keeping the water down below the joint while the same is being made and in protecting it with care after the same is made.

In taking up and relaying sewers at Pocomoke City, Md., it was observed that, even though little care had been taken in laying the sewers, the sand was so fine that it ultimately, during a period of ten years, filled up all of the leaky joints where the work was laid on boards and where the pipe joint had been made with jute and an attempt made to cement it; so that no leakage was observed when the sewer was taken up and relaid, although no cement could be found on the joints, the ground water rose almost to the ground level during certain seasons of the year, giving a head of 6 feet.

Some of this work was relaid using "G. K. Compound," but the results could not be claimed as satisfactory because of the greasy ends of some of the old pipe relaid and because of the disposition of the pipe to assume the slope of the ground, after the pouring of the joint, when the temperature was over 60 degrees Fah.

In Atlantic City, pipe joints are made using a dough-like mixture of Portland cement and pine tar following the jute. In warm weather this mix also is somewhat affected by the heat. After a given period, however, when the pipes are set on end until the cement starts to set, or if laid on the ground surface and the pipe alignment kept as desired until the set has started, fairly good results are obtained with this mix.

The writer has used sulphur and sand, which comes mixed in the proper proportion under the name "Pozite." This material hardens more quickly than the tar or asphalt products, so that pipe can be left in any position without affecting its alignment when two pieces are jointed on top of the ground and laid in the trench in lengths 6 feet long. This material forms a very rigid joint, so that it is essential that the best of attention be given to securing a rigid foundation under the pipes for their entire length.

Both of these methods were used at Kensington, Md., on work built under the writer's supervision, with very little leakage in five miles of 8, 10, 12 and 15-inch pipe, the depth of water in the 15-inch outlet being only five-eighths of an inch and velocity 2 feet per second.

The character of a soil may influence methods somewhat, as the writer has observed that fine, sandy, water-bearing soils hold the water back from passing freely and the fine sand adds finally in making the work more or less water-tight by filling small holes or pores. This condition was found at Cambridge, Md., where a 6-inch cement collar was used around each joint and the back filling done immediately (all work was laid on wood cradle); and while the head was 6 feet, there was very little seepage, using a mix of one part cement to one of sand.

Where the bottom is a gravel carrying large amounts of water, one of the most difficult waterproofing problems arises. To meet these conditions, and to keep down the cost of the work at the same time, was a condition encountered by the writer at Downingtown, Pa., where 12 miles of sewers ranging from 8 to 18 inches in diameter are being laid. Under the specifications the contractor was required to keep all trenches free of water while the pipe was being laid and until the cement joint had time to properly set. Where the water occurred in such quantities as to require the use of a 3-inch centrifugal pump, an Edison No. 4 diaphragm pump run by gasoline engine, and an additional pump of same kind operated by hand, it was, of course, necessary to abandon the cement joint.

In the writer's experience, sulphur and sand has given the best results to secure watertight work. In using this it was found that, by joining two 3-foot lengths of pipe together and capping the end with a terra cotta cap, and then filling the pipe with water on the inside, thus making a 3-foot head on the joint and 6-foot on the cap, the pipe joint under the 3-foot head only leaked five drops a minute and the cap about the same.

When the pozite joint was placed in the cold spring water in the trench a slight shrinkage took place, as was discovered by giving the joint a good brush coat of warm pine tar. Upon breaking the joint the tar was found to have penetrated practically through two inches of pozite coating through the small contraction cracks which occurred in the pozite and also between the pozite and the pipe surface, even though every pimple on the pipe showed up clearly in the form of the pozite. It was, therefore, considered necessary to take additional precautions. An additional sum of 5 cts. per foot was allowed for 8, 10, and 12-inch pozite points, and 10 cts. per foot for 15 and 18-inch pipe under the contract when ordered. Any additional work must be paid for at cost plus 10 per cent. Therefore, when the writer ordered that all joints be given a coat of cold pine tar and dry cement be sprinkled on the pine tar and worked in with the fingers, the labor and materials were paid for extra. While the dry cement could be handled fairly well on the bank, it was difficult in the trench and the result none too satisfactory. The painting was adhered to, however, and allowed to dry somewhat by placing cold water spray thereon, and then the entire joint in the trench was embedded in a 2-inch cement mortar joint, using one part of cement to one part of sand, and the joint protected by unbleached cotton cloth bound round the joint. This cloth turned the water itself, but, to make matters better, the entire joint was packed in the best clay found on the immediate work, water being kept off the joint until it was properly imbedded. The increase in cost for the additional work and materials amounted to 6 cts. per foot and 5 cts. for pozite under the contract, or 11 cts. per foot; which, it is believed, was warranted, as the sewage must all be handled by a pumping station. As a result of laying about a mile of sewer using this method, 8-inch pipe subjected to a 3-foot head, with springs in trench, etc., showed a $\frac{1}{4}$ -inch stream on the bottom of an 8-inch sewer. No attempt has been made to measure the actual quantities of seepage as yet because the work is incomplete; but it is intended to obtain the results in gallons per mile per 24 hours when the work is completed.

Very truly yours,

HERBERT W. HATTON,
Consulting Engineer.

The WEEK'S NEWS

The Columbia River Highway—Road Finances of New Jersey, Missouri and Alabama—Water Rate Cases of Long Branch and Richmond (Ind.)—The Rate Cases of Terre Haute and Kansas—Fires in Baltimore and Omaha—The Fire Loss of New York—City Manager Events in Tiffin, East Cleveland, Sherrill and Roswell—Purchasing in Indianapolis—Garbage Collection in Philadelphia and Ogdensburg—New Garbage Plant for Bridgeport—The Reorganized Bridge Department of New York.

ROADS AND PAVEMENTS

Columbia River Highway Opened.

Portland, Ore.—With elaborate ceremonies and pageant at Multnomah Falls which were witnessed by a representative of President Wilson and thousands of visitors from many parts of the west, the Columbia River highway was opened to the public. President Wilson pressed a button in Washington which released a diminutive guillotine which cut a cord, unfurling a flag over the Falls. There were addresses by Governor Withycombe, Mayor Albee, S. C. Lancaster, Rufus C. Holman, Frederick V. Holman, H. L. Fittock and others who worked for the building of the beautiful scenic highway. Water which had just fallen 800 feet down the falls was sprinkled from a silver urn onto the highway. Carrier pigeons were released bearing messages announcing the event to commercial organizations of the northwest. John B. Yeon, roadmaster of the highway, was presented with a silver plaque.

To Work Prisoners on City Streets.

Lorain, O.—The city council has passed an ordinance permitting the use of prisoners on work on the city's streets. All persons sentenced for violation of city ordinances or for non-payment of fines will be made to work out the sentence on the allowance of fifteen cents per hour. The director of public service is to make the necessary regulations and to appoint overseers who are to be given police powers. The cost of transporting, maintaining and disciplining prisoners is to be paid out of the street repairing fund. City officials are determined that the law shall be vigorously enforced and it is expected that hoboos will avoid the city in the future.

New Jersey Road Report.

Trenton, N. J.—In the section dealing with maintenance of the report of State Road Commissioner Stevens he states that the cost of improvement and upkeep will be enormous, even with the utmost economy, and waste may prove ruinous. A high standard of efficiency is impossible without team work and central control and discipline. To provide these without undue interference with local self-government is not easy. The problem has two very distinct sides, the organization and recruiting of road forces and the raising of road funds. While distinct, these are closely related. "After much study and thought, I am firmly convinced that a modification of the French system will be found as well suited to our needs as anything yet suggested. I would propose to form a state road force with a chief engineer, under whatever name may be chosen, as its head. This force would be divided into two or more grades, the upper one being engineers, the lower one inspectors, foremen, road overseers and patrolmen. These grades would include all the skilled men used. Admission would be by civil service examination and upper grades would be filled by promotion, after examination, wherever practical. I suggest that any public body applying for, or receiving, state aid in any way must employ only members of the state road force, excepting, of course, for ordinary labor. The men for this skilled work would be detailed by the chief engineer or some of his subordinates and be subject to recall by him. There probably would be at all times a considerable number of men on the waiting list."

Commenting upon the demand for state aid, which, he said, should be fostered, Colonel Stevens pointed out that the motor vehicle fund this year will amount to about

\$1,200,000 net. In addition, this year's appropriation to the state road fund is \$500,000 and the appropriation for prison labor \$90,000. The motor vehicle fund is increasing rapidly, and Colonel Stevens said he would not favor its diversion from the purpose of road repair, to which it is now devoted. "A large amount of money is raised," continued Colonel Stevens, "by local taxation and bond sales. What this sum is no one knows, but this fact is of the greatest importance in drafting any comprehensive financial plan. The commission must get this information. It would seem feasible to devise a scheme for road taxation of general application throughout the state. This, on the average, should impose no greater burden than now exists. The proceeds should be handled as the state school tax is handled, that is to say, distributed to road needs, though raised on the basis of ratables. The same reason, that of general interest, is common to both cases and the underlying principles on which control and state aid are provided are the same.

City Wins in Street Widening Case.

Kansas City, Mo.—The way for the widening of Sixth street, from Broadway to Bluff street, has been opened by the decision of the Supreme Court of the United States, affirming the proceedings in lower courts. The opinion upheld the city in every contention against the thirteen railroads and other corporations opposing it. The special plea of the Union Bridge and Depot Company was also denied. The question of widening the street from Broadway to Grand avenue was an issue in the last municipal campaign. The proceedings just concluded began in 1909, supplemental proceedings being started in 1911. Both have been passed on by the Missouri Supreme Court. The reopening of the Inter-City Viaduct, on which conferences are being held, would mean a clear traffic way to the Kansas side in case the Sixth street widening goes forward.

State Aid in Missouri.

Jefferson City, Mo.—State Auditor Gordon has apportioned \$250,000 among the various counties from the good roads funds and requisitions may be drawn on this until August 1. For the biennial period ending at the close of the present year, the state will have spent \$860,000 on the highways, of which \$350,000 will be used for dragging roads. The increased expenditures on the part of the state for road purposes will be approximately \$60,000 this year. The funds are not distributed on the basis of the taxable wealth of the counties and cities. Jackson, Buchanan, and St. Louis counties will draw \$7,500. The city of St. Louis will receive but \$7,500, although its valuation is \$647,442,174. Jackson has a total valuation of \$236,069,110, Buchanan \$51,063,158 and St. Louis county \$67,976,253.

Road Finances in Alabama.

Montgomery, Ala.—Alabama spent last year in the construction of roads and bridges the sum of \$4,337,188.44. Of this amount \$289,808.88 came out of the state treasury, and the balance was spent by the counties. The total number of miles of good roads constructed was 1,990. These figures were compiled by R. P. Boyd, assistant state highway engineer, and are part of the annual report of the highway department for the year 1915. Last year was the banner year in the state for road building. A million and a half dollars more were spent in 1915 than in 1914, and a great many more miles of good roads were constructed than during the previous year. The total spent in 1915 was \$3,017,591.96, of which amount only \$181,025.30 came out of the state treasury. Jefferson county led the state in ex-

penditures for roads and bridges. During the year that county spent \$329,213.12 on roads and \$150,216 on bridges, in round numbers nearly half a million dollars. Montgomery county followed second, spending \$184,502 on roads and \$28,560 on bridges. The total amount issued in bonds and warrants during the year for road and bridge construction was \$2,587,977.80. Shelby led the state, issuing warrants to the extent of \$260,000. The highway department figures show that the state last year constructed 177 miles of good roads. The various counties built 1812 miles, the material used being macadam, chert, gravel and sand clay. The total mileage of road in Alabama is 55,746, with only 8,613 miles of improved road. Montgomery county leads the state in good road mileage, the total being 450 miles of good roads. The various counties built 1,812 miles, of graded road. Since the creation of the highway department in 1911, the percentage of improvement in road and bridge construction has been 127, according to figures of the department.

SEWERAGE AND SANITATION

Threaten to Fine Officials for Bad Sewers.

Toledo, O.—Every member of the city council is liable to a \$500 fine, according to the state board of health. The state board has repeatedly demanded construction of intercepting sewers to prevent contamination of Ten-Mile and Swan creeks. The city council has made little, if any, progress in carrying out the order, which dates back to the fall of 1913, but it has just begun work on the problem. Watson G. Harmon, head of the sanitary experiment station of the engineering school of the University of Michigan, has been engaged by Service Director Goodwillie to work out a general sewer survey for the city, in co-operation with first assistant city engineer Allen A. Jones. Harmon said it might take two years to solve Toledo's sewage problem. As now contemplated by Harmon and Jones, the survey first will be made with respect to the entire city. Then, as incidental considerations, special attention will be given in respective order to the Ten-Mile creek basin, the Swan creek drainage area; then the west side of the river and finally the east side. Harmon has been engaged under a special fund recently set apart for the investigation. This has satisfied the state board for the time being as Director Goodwillie has promised complete preliminary surveys within ten weeks. Pollution of the Ten Mile and Swan creeks must be stopped by Jan. 1, 1917.

Contractor Asks Extra on Sewer Job.

Philadelphia, Pa.—The Keystone State Construction Company has entered suit against the city in court of Common Pleas to recover \$50,000 damages for additional cost of construction in the erection of a sewer, due, it is alleged, to inadequate and misleading specifications for the work in question. In the statement of claim it is explained that the city advertised for proposals for the construction of the Gunners Run relief sewer according to plans and specifications on file in the department of public works. These call for a brick sewer ten feet in diameter, built in hard rock tunnel and the boring made by the city for the guidance of prospective bidders and designated upon the plans, it is declared, indicated that the major portion of the sewer tunnel was to be built in hard rock. In the entire length of the sewer, 1,900 feet, only about 225 feet, according to the plans, was to be built in soft material which required timbering. It is alleged that the city knew, or should have known, and had means of ascertaining, what the nature and character of the sub-soil was, and "that false and misleading representations showing the presence of hard rock throughout the greater length of the sewer tunnel were either knowingly or recklessly made for the purpose of influencing the bidding, whereby the city might obtain an undue advantage in procuring lower proposals for the work and reducing the amount, which it otherwise would have been obliged to pay for constructing the sewer." After starting work the plaintiff declares that the material in the tunnel was rotten rock and of such a character that it required

blasting and could not be supported without timbering. After giving the extra costs to the contractor in detail, the plaintiff asks to be reimbursed \$50,000.

English Sewage Disposal Farm Profitable.

Nottingham, England.—The annual report of the directors of the Nottingham Sewage Disposal Farm shows a net profit for the year 1915 of \$11,165 as against \$3,070 for the previous year. The principal sources of income were as follows: Sale of cattle, \$68,745; sale of pigs, \$5,115; produce, \$28,985; and dairy products, \$6,400. After experimenting for several years the directors came to the conclusion that dairying was unprofitable, and have concluded to discontinue that branch of the undertaking. In the future the farm will be devoted principally to live stock and farm produce. At present there are 583 head of cattle on the farm, a good percentage of which are fat and ready for market; 73 head of horses, and 218 head of pigs. This farm is owned and operated by the city of Nottingham, and the sewage from the city is used for fertilizing the soil. Under the present successful management of the farm the city is not only relieved of all expense in connection with its sewage disposal, but is receiving a substantial income from the undertaking, which has been steadily increasing for the past three years.

WATER SUPPLY

Opens Fight for Reduced Rates.

Long Branch, N. J.—Long Branch has opened its fight for lower water rates before the Board of Public Utility Commissioners. President Donges and Commissioner John W. Slocum listened to the evidence presented for and against the Tintern Manor Water Company. The contention of the city was that the old Long Branch Water Supply Company's plant was adequate to supply Long Branch, and that the Tintern Manor Water Company, when it took over the plant, enlarged its capacity to serve the city beyond all reason, and that the jump in rates is excessive. It was contended that the old Long Branch company's plant, with Takanassee and Hoey lakes and reservoirs, had a daily capacity of 42,000,000 gallons, with an overflow of 3,378,000 gallons into the ocean.

Dead Fish Pumped to Water Intake.

Sacramento, Cal.—Thousands of dead fish floating down the Sacramento river have been traced to the pumps which are draining reclamation district 1500. The state board of health has issued orders that the pumps be stopped unless the nets over the intake pipes be fixed to prevent the dumping of the fish from the overflow waters into the river. Numerous complaints were made to the city health officials that the fish in a state of decomposition were floating down right to the city water intake and gathering along the bank of the river above the intake. City commissioner Simmons notified the state health board. It was stated that the fish had been drawn into the pumps and dumped into the river by reason of a displacement of the screens. Frank Newbert, president of the State Fish and Game Commission said that each year a large number of fish, principally carp, die in the overflow waters and are carried into the Sacramento river when the districts begin to drain.

Protest Charge for Sprinklers.

Richmond, Ind.—Richmond manufacturers have filed a brief with the public services commission in the Richmond water rate case declaring that the additional charge proposed to be made against factories and other business concerns in Richmond that have put in automatic sprinklers as additional precaution against fire would be unfair and discriminatory, and that no one, not even the Richmond city water works itself, is asking for such charge. At a hearing before the commission, Chairman Duncan announced that the Richmond city water works needed more revenue, and indicated that at least a part of this additional revenue would have to be raised by making a charge against automatic sprinklers. Twenty-two manufacturing and mercantile con-

cerns that have put in sprinklers in their establishments protest. Walter Hutton, president of the water company, was one of the witnesses who testified that such a charge would be unfair and unjust. All the witnesses testified that the placing of automatic sprinklers by these concerns at their own expense greatly reduced the fire hazard, not only on the sprinklered property itself, but on all surrounding property, and that fire would be put out in these places with a much smaller amount of water than the water company would be required to supply if there were no automatic sprinklers. The brief points out that the twenty-two Richmond manufacturers and merchants have placed automatic sprinklers in sixty-six institutions at a cost of \$250,000. To assess a water charge against them, the brief says, would be to assess a penalty against preparedness and against measures for economy in the use of water to put out fires. The city of Richmond gave the water company \$55 a year for each fire hydrant in the city, from which the company is required to supply the necessary amount of water to put out fires in the city. The presence of automatic sprinklers in the sixty-six establishments, the brief says, reduces the amount of water that the company would be required to supply from the fire hydrants because the sprinklers put out a fire at once before it has a chance to spread, and become destructive.

STREET LIGHTING AND POWER

Lower Light Rates for St. Louis.

St. Louis, Mo.—A reduction of half a cent a kilowatt hour in the rates for electric current has been announced by the Union Electric Co., to become effective immediately. This reduction is due to a gain of more than 5,000 customers since the last reduction of half a cent, last December, bringing the total number of customers at present to more than 70,000. It had been announced that this reduction would be made when the number of customers reached 70,000, and the further announcement was made by A. C. Einstein, general manager of the Union Electric, that another reduction of a half a cent will be made when the number of customers reaches 75,000. The first step in the rate schedule is now reduced from 9 cents to 8½ cents, the second from 6½ to 6 and the third from 3½ to 3 cents. The first step applies to the first four kilowatt hours used for each room in a month; the second step applies to the next three kilowatt hours, in the third to all excess over seven kilowatt hours. For the purpose of calculating these rates three bedrooms are exempted from the room count. The minimum charge to residence customers remains at 50 cents a month, but no deposit is required.

The Terre Haute Electric Rate Case.

Terre Haute, Ind.—The case against the Terre Haute, Indianapolis and Eastern Traction Company, before the public service commission at Indianapolis continues. The attorneys and officers of the company are basing their side of the case on a somewhat indefinite apportionment of the property of the big traction and lighting company among the various branches of its business. Engineers of the public service commission who made the valuation of the property at Terre Haute contend that the apportionment they have made of the property gives the proper estimate on that part of the property of the company used for power and lighting at Terre Haute. The company gives electric current from its big central station at Terre Haute, to supply power and lighting service there; power for the Terre Haute street railway, some of the power for the interurban lines, which the company operates, and current for about twenty-one towns and villages in surrounding territory.

H. O. Garman, as chief engineer for the public service commission, submitted an appraisalment of the proportion of the total value of the property in Terre Haute that should be apportioned to the light and power business in Terre Haute and vicinity for rate-making purposes. Garman says the total value of the company's property in Terre Haute is \$1,522,307, and that \$822,522 of this sum should be apportioned to the light and power business in Terre Haute and vicinity for rate making purposes in

the present proceedings. This latter figure is more than \$1,000,000 below the figure placed on the value apportioned to the light and power business by company attorney Beasley who calculated \$1,900,000, exclusive of going value, which, he said, would add another \$600,000. The \$822,522 named by Garman was his estimate of the cost of reproduction of the property, while the present proportion of the valuation apportioned to the light and heat business in Terre Haute and vicinity was given by Garman as \$658,514. Garman said he found that about 40 per cent. of the current produced by the company's power station at Terre Haute was used for lighting and power, and 60 per cent. for interurban and street car service. The company tried to discredit the expert's valuations.

Edward C. Burch, a commission engineer, testified regarding the valuations he placed on various items of the company's property, saying that he had taken into consideration the poles used jointly with other utilities in Terre Haute. He testified that he had used approximately 4 per cent. for depreciation of the property in his estimates as to its value. H. E. Smith, chief engineer of the central station at Terre Haute, testified that the company has meters for wattage, voltage and amperage on its central and substations, and on the various types of machinery groups which generate alternating current, or transform alternating current into direct current. His testimony also brought out that the central station at Terre Haute provides practically all the current for several services of the traction company. T. F. Grover, general manager of the company, testified in effect that instruments used in measuring the various elements of the company's service had been known to get out of order, and that records of the total current consumed in the various branches of the company's enterprises, therefore, were incorrect. Engineers of the commission said privately that Grover's testimony was given with the idea of showing that the commission's staff was wrong in its valuations. These engineers said the meters used in Terre Haute in past years by the company for measuring its own consumption, were subject to variation, only in the same manner that all such meters are subject to variation, and that the records of the company from these meters had been checked and rechecked by the commission's staff to such a point that the deviations would make little difference. Between the valuations of the property by engineers of the commission and by experts employed by the company there is approximately \$1,000,000 difference. Mr. Grover also testified, after much questioning, that the meters used and the records kept, generally provide ways for apportioning the property used in producing current for the various elements, making up the sales totals of the company. He said later that "efficiency tests" applied to various current-generating machinery are, "to a very great extent," mere guesswork.

Frederick W. Ballard of Cleveland, represented the complainants in the Terre Haute case, and testified as to the valuation he had placed on the property. He gave the present value of the part of the plant, from which light and power is distributed for the local service in Terre Haute, as \$696,425, which, he said, included working capital allowance, engineering expenses and many similar items of that character. He estimated his figures, he said, on the basis that 40 per cent of the total plant of the traction company at Terre Haute, for central station purposes, is used in distributing and generating the current used locally there.

The Kansas Rate Case.

Topeka, Kan.—Three federal judges at Kansas City have handed down a decision in the natural gas case allowing the Kansas Natural to raise its rate to 32 cents per thousand feet within 60 days, and instructing the federal receiver, John M. Landon, to spend \$500,000 within six months and \$750,000 within a year in extending the mains to give adequate gas supplies and \$200,000 a year thereafter for five years. This order is not final. The three judges held that if it is found that the 32 cents is higher than necessary the surplus will be refunded to the consumers when the final order is made. They held also that none of the principal shall be turned over to the creditors until the ex-

tensions ordered by the court have been made. The receiver is instructed to file a bond for \$750,000 within sixty days. The public utilities commission assumed jurisdiction over the Kansas Natural and after a hearing authorized a rate of 28 cents per thousand feet in Kansas. The federal courts had ordered a 32 cent rate into effect. Injunction proceedings were instituted in the federal court to enjoin the public utilities commission from interfering with John M. Landon, receiver, in putting the 32-cent rate into effect. The court holds that a rate less than 32 cents per thousand feet will be insufficient; that the 28-cent rate fixed by the public utilities commission will be confiscatory and therefore in violation of the constitution of the United States. In its opinion the court notes several "errors" upon which the public utilities commission based its 28-cent rate. The state commission fixed the life of the gas fields at twelve years. The federal court says six years. The state commission assumed that Kansas Natural will have to pay 4 cents per thousand for gas. The federal court says 6 cents. The court says the commission did not allow enough by a quarter of a million dollars a year for extensions. The court holds that the commission should have figured on an 8 per cent return annually on the value of the property—the federal court used the commission's valuation of \$7,283,605—instead of 6 per cent, making another error of \$145,672 annually. This means that the commission did not allow enough revenue by \$1,497,317 a year. The court allocates this shortage between Kansas and Missouri, on the basis of 45 per cent. to Kansas and 55 per cent. to Missouri. By this allocation the court finds that the commission had not allowed the company enough Kansas revenue by \$680,979 a year. The commission had figured a surplus of \$147,848 a year on its basis of rate-making. The annual deficit of the Kansas Natural would therefore be \$533,131. The 32-cent rate, according to the court, will make up this deficit. The intervening petition of the Missouri public service commission and of Missouri municipalities was dismissed in this suit, the court holding it had no jurisdiction, as the Missouri commission had issued no order on which an injunction could be issued. The court also refused to pass on the validity of any city ordinance fixing rates in this proceeding. The court retains exclusive jurisdiction.

Attorneys interested in the case have conferred and discussed the court's order. Some of the questions to be solved are: Will the \$750,000 ordered to be spent for extensions bring sufficient gas to Topeka for next winter? Can the receiver secure 50 miles of pipe for extensions of the mains, as ordered by the court? Factories, gas representatives said, are making munitions, not gas pipe, and pipe line is made to order with no supply on hand. If it is possible to get the pipe and the receivers secure right of way, where will they get the gas? It was stated that all the gas in Oklahoma is tied up by Henry L. Doherty and his associates and the question was raised as to whether he would sell to the Kansas Natural. In the hearing before the federal court it was testified that it would require \$1,000,000 to put the Kansas Natural pipe line back in shape to handle gas, including the building of a new compressor station at Scipio at a cost of more than \$500,000. It was also testified that after spending this amount in rebuilding the line it would be necessary to spend that much more to buy gas and make extensions and connections. The Kansas utilities commission has not yet decided whether appeal will be made to the Supreme Court of the United States.

FIRE AND POLICE

Baltimore Grain Pier Fire.

Baltimore, Md.—Pennsylvania Railroad elevator 4, on the harbor front at Canton, a suburb, was burned with a loss of life first estimated at fourteen men, and injuries to more than forty others. The victims were mostly elevator employes and cargo trimmers. Two steamships which were loading grain at the elevator, also were badly damaged by fire and wreckage dropped upon them from the elevator. The flames spread to an ore pier next to the elevator, badly

damaging it. Several strings of grain cars in the elevator were burned. The fire is thought to have been caused by an explosion of grain dust. The blast blew out the ninety-foot tower, or upper elevator, and in an instant the whole building was ablaze. Estimates placed the loss at more than \$2,000,000. This represents the cost of the elevator, the damage to the two ships, and the value of the grain in the elevator and aboard the vessels. All together, about a million bushels of wheat, oats, barley, rye and buckwheat were destroyed. Scores of men barely escaped with their lives. Thirty-four grain handlers and stevedores who were imprisoned in the hold of one of the ships fought their way to an exit over piles of grain. Gaining the deck of the ship they found their way to shore cut off by the flames. Some of them jumped overboard and were picked up. Launches ran alongside and took off the others.

Low Fire Loss for New York City.

New York, N. Y.—The fire loss in this city in 1915 was \$5,757,018, or \$1.06 per capita, the lowest rate in the city's history, according to a report submitted by Robert B. McIntyre, Supervising Statistician and Examiner in the Department of Finance, to Controller William A. Prendergast. Mr. McIntyre adds, however, that this loss is high compared to the fire loss suffered by cities abroad and that New York still has much to learn from the fire prevention methods prevailing in Europe. He points out that the fire loss in the Netherlands is 7 cents per capita. Mr. McIntyre's report shows that the fire loss in this city for the last nine years has been as follows:

1907	\$9,413,042	1912	\$9,069,580
1908	9,261,078	1913	7,467,997
1909	7,431,635	1914	8,217,811
1910	8,591,831	1915	5,757,018
1911	12,470,806		

Mr. McIntyre gives the Fire Prevention Bureau credit for the decrease in fire loss in recent years. The three principal factors in this decrease, he says, are "systematic extension of fire prevention; monthly inspection by firemen, and increased efficiency in the uniformed force due to the Fire College and School of Industrial Training."

New Traffic Semaphore in Providence.



Providence, R. I.—The new traffic semaphore installed in a test by the Board of Police Commissioners on the corner of North Main and Waterman streets is proving very effective. The post is about 10 feet high and carries a revolving globe-shaped top, on two sides of which is the word "stop" in white against a red background and on the other two, alternately, "go" against a green background. The lettering is of glass so that red and green lanterns inside make the signal effective at night. The accompanying illustration shows the semaphore.

Paving Tar Starts Bridge Fire.

Omaha, Neb.—Fire starting from a huge bucket used by the workmen to heat the tar for the pavement, destroyed 500 feet of the east end of Locust street viaduct, causing estimated loss of \$50,000 and doing damage that will delay the opening of the structure at least two months. The flames, which leaped high into the sky,

Courtesy, Providence (R. I.) Journal.
NEW TRAFFIC SIGNAL
IN PROVIDENCE.

made a spectacular blaze, the wooden flooring of the viaduct and the pitch-soaked timbers burning like tinder. Firemen were handicapped in fighting the flames because of the stiff wind, the huge tanks of the Standard Oil company, located at the extreme east of the structure being for a time endangered. The timbers and the false work of the viaduct for nearly 500 feet were entirely burned away, and the steel work so badly warped by the intense heat that it will have to be replaced. Telephone cables running parallel to the structure were destroyed and the heat of the flames twisted the street car rails into grotesque shapes. The viaduct was rapidly nearing completion and street cars were to start running across it within a few days. The work of rebuilding started immediately.

GOVERNMENT AND FINANCE

City Manager in New Charter.

Tiffin, O.—Tiffin charter commissioners have unanimously declared for the city manager form of government to take the place of the present municipal government. There will be a commission of five elected on a non-partisan ballot, who will choose one of their number president, to have the fiscal power of mayor. The commission will appoint the city manager. The elective officers will be subject to the recall. The charter commissioners now will complete the draft of the charter that will be submitted to the voters for approval some time before April, 1917.

Women Win Vote in City Election.

East Cleveland, O.—East Cleveland granted, by home rule, suffrage to women in municipal elections. The proposal carried in every one of the four wards of the city, the total vote being 936 to 508. At the same time the electors approved the city manager form of government by a vote of almost four to one, the totals being 1,154 to 297. Mayor Minshall was one of the commissioners to frame the charter. The administration is in accord with every provision.

Mayor Need Not Swear He Worked for Salary.

Mount Vernon, N. Y.—Mayor Fiske of Mount Vernon, who refused to take an oath that he had performed the services of mayor for a month, and upon which refusal Controller Berg of Mount Vernon refused to give him his draft of \$416 for a month's pay, has won his case. Justice Young at White Plains has handed down a decision in which he held that the salary was fixed by the charter, that it was incident to the office, and that all the mayor is required to do to get his money is to sign the payroll, which contains at its head as a form of receipt an oath starting "Being duly sworn," which the court holds is sufficient.

Manager of New City.

Sherrill, N. Y.—Chester A. Brown has been elected manager of the new city of Sherrill, at the first meeting of the commissioners. The manager of the new city has the power and duties to see that the laws and ordinances are enforced; to appoint and to remove all directors of departments, and all subordinate officers and employees in the departments; to exercise control over all departments and divisions that are created by the commission, and to keep the commission fully advised as to the financial condition and needs of the city. The city clerk will act as city accountant, and shall be sealer of weights and measures. He shall also be the registrar of vital statistics and will issue all licenses.

Recount Ordered in Montclair Election.

Montclair, N. J.—An order signed by Chief Justice William S. Gummere providing for a recount of the ballots cast June 6 last, in the referendum in Montclair for commission government has been filed with county clerk Joseph McDonough. The recount will be started June 24, and will probably take three or four days. The application was made on the ground that the result was affected by the rejection of ballots and by the counting of marked ballots. The application was made following several conferences between lawyers representing the Montclair citizens' committee, which actively opposed commission government. Leaders in the Commission Government League think it

unlikely there will be a difference of twenty-seven votes in a recount of the affirmative vote of 1,151. The margin of safety for commission government was twenty-six votes. To insure a legal election under the Walsh act, 1,125 affirmative votes were necessary, that figure representing thirty per cent. of 3,749, the total vote cast at the last general election. Providing the result is unchanged the election of commissioners will be held July 11. The list of candidates in the field for commissionerships now totals eighteen.

City Manager Resigns.

Roswell, N. M.—This city is without a city manager since the resignation of W. M. Atkinson. His resignation was accepted at the last session of the city council and no successor has yet been named.

The Purchasing System of Indianapolis.

Indianapolis, Ind.—Hubert S. Riley, city purchasing agent, has made public some of his plans for operating the newly established purchasing department. He has distributed to heads of departments at the city hall a purchasing schedule which will become effective June 15, when he opens the department. All articles bought by the city have been classified on the schedule, and bids for articles of different classification will be received on regular days.

On Monday of each week bids will be received on groceries and foodstuffs used in the city hospital. Bids for coal, street building material, sewer pipe, automobile supplies, lumber and painters' supplies will be received every Tuesday morning, and for grain, hay and feed will be received on Tuesday afternoon. On Wednesday, harness, rubber goods, awnings, hose, belting, engine room supplies, castings, pipe and pipe fittings, machinery supplies, hardware and plumbers' supplies; Thursday, on supplies of drugs and chemicals, hospital and surgical supplies, electrical and gas appliances; Friday, janitor's supplies, laundry supplies, disinfectants, paper goods, binding, printing, office supplies, stationery, drawing materials, engineering and photo supplies; Saturday, dry goods, wearing apparel, regalia, carpets, shades, furniture, seeds and plants.

Riley said the schedule has been arranged for the convenience of business men that they may know when bids on certain classes of supplies are to be received. As soon as a requisition for supplies is received from any department, a form setting forth the amount and quality of the material to be bought will be posted on a bulletin three days in advance of the time for receiving bids.

STREET CLEANING AND REFUSE DISPOSAL

Fines Garbage Collectors.

Philadelphia, Pa.—Penalties aggregating \$1,698.50, were assessed against the contractors in charge of street cleaning for derelictions of duty during the month of May, according to a statement by William H. Connell, of the Bureau of Highways. Senator E. H. Vare, street cleaning and rubbish collecting contractor, was fined \$478.50. In April he was penalized to the amount of \$1,024, out of a total fine on all contractors of \$1,809. Steps now are being taken to maintain the street cleaning work on a high plane, and a vigorous campaign is being waged by the Department of Public Works, Mayor Smith and the Chamber of Commerce to bring about cleaner highway conditions.

New Garbage Plant for Bridgeport.

Bridgeport, Conn.—Erection of a large garbage reduction plant with a capacity of 200 tons per day, or nearly four times the capacity of the present plant and a large modern slaughter house, has been started. Contracts have been signed by the city with Charles C. Fischer, owner of the present small plants, which have become entirely inadequate to handle the increasing amount of garbage and slaughtering in Bridgeport. Dependent upon the fulfillment of the terms of a rigid set of specifications, the contract for reduction and disposal of the city garbage for the next ten years, with no increase in the price, has been awarded to Mr. Fischer. It is estimated that the new plants will cost him nearly \$50,000. After nearly two years of study on the question of garbage disposal, it was the opinion of the members of the board of health that a reduction plant

of sufficient size and properly equipped with the latest machinery was the best method. By the terms of the contract recently signed by Fischer with the mayor and members of the health board acting for the city, the contractor agrees to have the new plant completed and in operation by October 1. It is agreed that Fischer will forfeit \$25 for every day after that date, until the plant is completed. Fischer is to erect a three story building of large dimensions. It is to be constructed of cement blocks, with cement floors and inside finish. It is to contain eight new digestors in addition to the four digestors now in use. The present plant can only handle 50 tons a day in normal work, but can handle 60 tons by forcing the machinery, providing there are no breakdowns. The digestors are to be in three separate units of four each with separate receivers and presses. There are to be concrete dumping pits for the raw garbage with conveyers to take the material to the digestors. The pits are to be cleaned every day and washed and scrubbed. Fischer agrees to conduct the plant and reduce the garbage by such methods as will reduce the odors to the minimum and in accordance with reasonable regulations made by the health department. The contract stipulates that Fischer shall erect stone walls around the small ponds on the property, grade the grounds surrounding the buildings and keep lawns and shrubbery to beautify the grounds. Ground has already been broken for the new plants. One of the units of new machinery is to be in operation by July 1. The ten year contract dates from May 1, 1916, and is to continue until May 1, 1926. The price for reducing the garbage is to be \$1 per ton, as in the old contract. The new slaughter house is to be of dimensions suitable to care for the needs of the city for many years to come. The killing floor is to be 30 by 40 feet. There will also be a cold storage room with refrigeration machinery. Fischer is to be allowed to conduct the storage room and collect from the butchers who use it. The city is to collect the fees for slaughtering as in the past. At present the amount of garbage is increasing rapidly. About 60 tons a day are being collected now and it is estimated by the officials that before the end of the summer and vegetable season the amount will increase to 90 or 100 tons per day.

Garbage Collection Plan.

Ogdensburg, N. Y.—The board of health has adopted a new plan for the collection of garbage throughout the city. The plan is to have the work done by a contractor who must submit the lowest bid to perform the service for one year. He will be required to furnish galvanized receptacles 22 inches high and 14 inches in diameter. The garbage will be collected twice a week from April 1 to October 1, and once a week during the balance of the year. The contractor will be required to furnish a bond for \$500.

MISCELLANEOUS

Abandoned Canal Lands for New York Cities.

Albany, N. Y.—Municipalities expecting to purchase abandoned canal lands should make early preparations to acquire the property, according to General William W. Wotherspoon, state superintendent of public works. This is especially important, he considers, where municipalities plan to make use of the lands for public purposes. Otherwise, he said, it is probable that the lands would be abandoned before municipalities are ready for their payment or use. The Walters law, enacted this year, providing for the disposal of abandoned canal lands and structures, directs the state engineer and surveyor and the superintendent of public works to report to the canal board, showing the sections of the new canals "completed and placed in operation" and describing in detail the lands and structures owned by the State for canal purposes rendered no longer necessary or useful as parts of the barge canal or as an aid to navigation thereon." General Wotherspoon said that attention has been given to carrying out the objects of the law, but no definite policy decided upon. Two plans have been considered. One is to await until application for the

lands are made and then report that they are no longer needed by the state. The other is to certify to the canal board such lands and structures as are rendered useless on account of the operation of the barge canal system. There are about eight hundred highway bridges over the old canals, many of which are old and not suited to heavy traffic or motor vehicles. To replace them with proper structures, General Wotherspoon estimates, would cost the state \$15,000,000 within a few years. In several instances where the old canal has been closed crossings have been filled in making bridges unnecessary. This situation makes it urgent on the part of the state to abandon and close the old canals as soon as possible. The department of public works and the department of state engineer and surveyor have done some work towards reports on abandonment. Accurate surveys are being made and maps prepared, showing state lands. General Wotherspoon has records showing encroachments including nearly every kind of structures from a city hall to breweries. Telephone lines, pipe lines, railroad tracks, bridges and other structures as well as buildings are on state land. After a report is made by the superintendent of public works and state engineer and surveyor, the land board has power to declare the lands and structures abandoned, after giving a public hearing. The commissioner of the land office then appraises the property and conducts the sale.

Anti-Signboard Regulation in Effect.

Watertown, N. Y.—All highway patrolmen in the northern division have been notified by the division engineer, Theron M. Ripley, to remove at once advertising signs placed within the rights of the highway. This is done in accordance with the state highway law which places a penalty of a fine for putting up any advertising matter along the highway property or its limits. It also includes the placing of signs upon the property of private persons and the patrolmen will be permitted to remove all such articles unless they have been erected with the consent of the owner.

Begin Reorganization of Construction Work.

New York, N. Y.—Commissioner F. J. H. Kracke has started the preliminary work incidental to the reorganization of the Bridge Department into the Department of Plant and Structures, as provided in a bill passed by the recent legislature. Committees appointed by Commissioner Kracke have begun to make surveys of the building construction work, building maintenance work and repair shop work now supervised by the various city departments which are responsible to the mayor, but which will be centralized as part of the work of the Department of Plant and Structures. The surveys begun are in eight of the city departments: The Departments of Health, Bellevue and Allied Hospitals; Street Cleaning, Charities, Correction, Parks, Fire and Police. The field surveys are under the direction of a committee, of which Commissioner Kracke is chairman, and F. Carter Childs is vice-chairman. The other members of the committee are: E. P. Goodrich and L. V. Sheridan, Bureau of Municipal Research; Thomas P. Smith, Bureau of Contract Supervision of the Board of Estimate and Apportionment; Robert G. Newbegin, Bureau of Standards of the Board of Estimate and Apportionment; E. A. Byrne, chief of engineering staff, Department of Plant and Structures; J. J. Holwell, deputy commissioner, Department of Plant and Structures; Calvin I. Crocker, assistant engineer, Department of Plant and Structures. This committee will supervise the work of the field survey subcommittees and have the assistance and co-operation of representatives designated by the departments affected. Preliminary studies indicate that conditions can be improved possibly very speedily by the installing of better methods and by transferring to the better equipped shops work done in an unbusinesslike way in small and expensive shops. It has been suggested that one central shop be built. A site suggested is at the Long Island City end of the Queensboro Bridge. However, no recommendations will be made either to the mayor or to the Board of Estimate and Apportionment until all of the facts are carefully canvassed and the best method for obtaining results is determined.

NEWS OF THE SOCIETIES

Calendar of Meetings.

June 19-22.—SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION. Annual meeting, Charlottesville, Va. Secretary, F. L. Bishop, University of Pittsburgh, Pittsburgh, Pa.

June 20-22.—NORTH CAROLINA GOOD ROADS ASSOCIATION. Annual convention, Wilmington, N. C. Secretary, Dr. Joseph Hyde Pratt, Chapel Hill, N. C.

June 20-22.—SOUTH CAROLINA STATE FIREMEN'S ASSOCIATION. Annual convention, Orangeburg, S. C.

June 21-23.—TRI-STATE WATER AND LIGHT ASSOCIATION OF THE CAROLINAS AND GEORGIA. Annual Convention, Isle of Palms, S. C. Secretary-treasurer, W. F. Stieglitz, Columbia, S. C.

June 26, 27.—TEXAS TOWN AND CITY PLANNING ASSOCIATION. Annual meeting, Chamber of Commerce Building, Dallas, Tex. Secretary, J. E. Suratt, Sherman, Tex.

June 27-30.—IOWA STATE FIREMEN'S ASSOCIATION. Annual convention, De Witt, Ia.

June 27-30.—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual meeting, Pittsburgh, Pa. Secretary, Charles Warren Hunt, 220 West 57th St., New York, N. Y.

June 27-29.—NATIONAL GAS ENGINE ASSOCIATION. Annual convention, Chicago, Ill. Secretary, H. R. Brate, Lakemont, N. Y.

June 27-30.—AMERICAN SOCIETY FOR TESTING MATERIALS. Annual meeting, Atlantic City, N. J. Secretary, Edgar Marburg, University of Pennsylvania, Philadelphia, Pa.

June 27-30.—GOVERNORS' CONFERENCE. Annual meeting, Salt Lake City, Utah. Secretary, M. C. Riley, Washington Building, Madison, Wis.

June 28, 29.—NEW YORK STATE ASSOCIATION OF FIRE CHIEFS. Annual convention, Elmira, N. Y. Secretary, Henry R. Yates, Schenectady, N. Y.

June 28-30.—MICHIGAN LEAGUE OF MUNICIPALITIES. Annual meeting, Battle Creek, Mich.

June 28-30.—NEW YORK STATE ASSOCIATION OF COUNTY HIGHWAY SUPERINTENDENTS. Annual Convention, Glens Falls, N. Y.

July 3-5.—MONTANA STATE FIREMEN'S ASSOCIATION. Annual convention, Butte, Mont.

July 5-6.—GEORGIA STATE ASSOCIATION OF CHIEFS OF POLICE AND MARSHALS. Annual convention, Savannah, Ga. Secretary, J. P. Griffin, West Point, Ga.

July 11-13.—MUNICIPAL LEAGUE OF INDIANA. Annual meeting, Goshen, Ind.

July 13-15.—MONTANA STATE AUTOMOBILE AND GOOD ROADS ASSOCIATION. Annual Convention, Anaconda, Mont.

July 20-22.—SOUTH CAROLINA STATE FIREMEN'S ASSOCIATION. Annual Convention, Ogdensburg, S. C.

Aug. 7-9.—CITY MARSHALS' AND POLICE CHIEFS' UNION OF TEXAS. Annual convention, Houston, Tex.

Aug. 8-10.—OHIO POLICE CHIEFS' ASSOCIATION. Annual convention, Cedar Point, O. Secretary, Ex-Chief James Stamberger, E. Cleveland, O.

Aug. 8-11.—DOMINION ASSOCIATION OF FIRE CHIEFS. Annual convention, Windsor, Ont. Secretary, James Armstrong, Kingston, Ont.

Aug. 21-27.—PACIFIC COAST ASSOCIATION OF FIRE CHIEFS. Annual convention, San Diego, Cal.

Aug. 28-31.—NATIONAL TAX ASSOCIATION. Tenth annual conference, Indianapolis, Ind.

Aug. 29-31.—LEAGUE OF CITIES OF THIRD CLASS IN PENNSYLVANIA. Seventeenth Annual Convention, Johnstown, Pa. Secretary, Fred H. Gates, City Clerk, Wilkes-Barre, Pa.

Aug. 29-Sept. 1.—INTERNATIONAL ASSOCIATION OF FIRE ENGINEERS. Annual convention, Providence, R. I. Secretary, James McFall, Roanoke, Va.

Sept. 4-8.—SOUTHERN APPALACHIAN GOOD ROADS ASSOCIATION. Ninth

annual convention, Lexington, Ky. Secretary, Dr. Joseph Hyde Pratt, Chapel Hill, N. C.

Sept. 8-9.—LEAGUE OF AMERICAN MUNICIPALITIES. Annual convention, Newark, N. J.

Sept. 13-15.—NEW ENGLAND WATER WORKS ASSOCIATION. Convention, Portland, Me. Secretary, Willard Kent, Narragansett Pier, R. I.

Sept. 13-15.—WASHINGTON STATE ASSOCIATION OF COUNTY COMMISSIONERS. Annual meeting, Tacoma, Wash. Secretary, J. C. Hansen, Port Angeles, Wash.

Oct. 9-11.—NATIONAL HOUSING ASSOCIATION. Annual meeting, Providence, R. I. Secretary, Lawrence Veiller, 105 East 22d St., New York City.

Oct. 9-13.—AMERICAN SOCIETY OF MUNICIPAL IMPROVEMENTS. Twenty-third Annual Convention, Robert Treat Hotel, Newark, N. J. Secretary, Charles Carroll Brown, 702 Wulsin Building, Indianapolis, Ind.

Oct. 16-21.—NATIONAL SAFETY COUNCIL. Fifth Annual Safety Congress, Detroit, Mich. Secretary, W. H. Cameron, Continental and Commercial Bank, Chicago, Ill.

Oct. 24-27.—AMERICAN PUBLIC HEALTH ASSOCIATION. Annual Convention, Cincinnati, O. Secretary, Prof. Selikar M. Gunn, Boston, Mass.

Dec. 27-30.—AMERICAN ECONOMIC ASSOCIATION. Annual meeting, Columbus, Ohio. Secretary, A. A. Young, Ithaca, N. Y.

Feb. 5-12, 1917.—AMERICAN ROAD BUILDERS' ASSOCIATION. Seventh American Good Roads Congress and Eighth National Good Roads Show, Mechanics' Hall, Boston, Mass. Secretary, E. L. Powers, 150 Nassau street, New York City.

Dominion Association of Fire Chiefs.

The eighth annual convention of this association will be held at Windsor, Ont., August 8-11. A program is now being arranged and the following topics will be discussed:

"The Significance of the Fire Waste," by Franklin H. Wentworth, Boston, Mass., secretary of the National Fire Prevention Association.

"The Fire Wall an Essential in Crowded Buildings," by H. F. J. Porter, New York, N. Y.

"The Duties, Responsibilities and Work of the Fire Marshal's Office," by E. P. Heaton, Toronto, Ont., provincial fire marshal for Ontario.

"Demonstration of Spontaneous Combustion, and Its Causes," by George E. Walker, chemist, Canadian Salt Works, Sandwich, Ont.

"Fires Caused by Accident, Carelessness, or Design," by Chief J. W. Graham, Ottawa, Ont.

"Town Planning and Fire Prevention," an illustrated address, by a member of the commission on conservation, Ottawa, Ont.

"Standardization," having special reference to its need regarding fire apparatus and tools, by J. Grove Smith, commission on conservation, Ottawa, Ont.

A practical demonstration of the automatic fire alarm system and the sprinkler systems, under actual fire conditions, will be given in a large frame building specially erected for this purpose, and which will be set on fire during the convention.

The usual question box will be on the secretary's table and questions placed therein, relating in any way to the fire service will be answered by a round table discussion.

Tri-State Water and Light Association.

The sixth annual convention of the Tri-State Water and Light Association of the Carolinas and Georgia will be held at the Isle of Palms, S. C., June 21, 22 and 23.

W. F. Stieglitz of Columbia, secretary-treasurer of the organization, has completed all arrangements for the meeting and has secured speakers, among them, R. E. Milligan, New York; Mayor T. T. Hyde and P. H. Gadsden, Charleston; Vann Livingston, Atlanta; A. A. Passolt, Newman; W. M. Gallant, Charlotte; J. W. Neave, Salisbury; F. C. Wyse, Columbia; A. J. Sproiles, Greenwood. J. G. Barnwell, city manager of Rock Hill, will speak on "The City Manager and His Responsibilities." The various speakers will cover all important matters relating to water and light affairs and management of departments.

Working hours of the convention will be so arranged as to allow ample time for the varied amusements at the Isle of Palms. The opening will be 10 o'clock, June 21. Atlanta, Macon and Asheville will be in the race for the next annual meeting. Manufacturers and suppliers of waterworks and lighting supplies will show an excellent line of exhibits.

Texas Town and City Planning Association.

The tentative program for the meeting of the association, which will be held June 26 and 27 at Dallas, has been announced. The meeting will be opened by President O. C. Ahlers, of Sherman, Monday morning. The following papers will be presented: "Recreational Needs of the Town," by Geo. E. Kessler, landscape architect, St. Louis, Mo.; "Practical City Planning," by Myron H. West, president, American Park Builders, Chicago, Ill.; "Shade Trees as a Civic Asset: How to Get and Maintain Them," by F. K. McGinnis, city forester, Dallas; "The Old and the New Paris," by W. H. Dunn, landscape architect, Kansas City, Mo.; "Removing Menaces to Health," by H. W. Van Hovenberg, sanitary engineer, Health Department, Dallas; "Needed City Legislation," by Prof. H. G. James, Bureau of Municipal Research and Reference, University of Texas, Austin; paper, by Arthur H. Helder, landscape architect, Kansas City, Mo.; "Sewerage System of Cleburne," by O. L. Bishop, Cleburne; "Care of the Cemetery," by Mrs. Osco Taylor, Mineral Wells; "The Twentieth Century City," by Henry D. Lindsley, Mayor of Dallas, Dallas; "Lessons for Texas Cities from Paris," by E. H. McCuistion, Mayor of Paris, Paris; "Women's Work in City Beautification," by Mrs. J. C. Pyle, Sherman; "The Place of the Chamber of Commerce in City Plan-

ning," by J. R. Babcock, Chamber of Commerce and Manufacturers' Association, Dallas; "City Planning for the Reduction of Fire Waste," by S. W. English, State Fire Marshall, Austin; "Planning of School Grounds and Gardens," by Prof. C. L. Davis, North Texas State Normal College, Denton, Texas; "Report of National City Plan Association," by K. K. Hooper, editor, Welfare Department, Dallas News, Dallas; "Cooperation of the Chamber of Commerce and the City Government in Sanitary Campaigns," by J. D. Harper, chairman, Chamber of Commerce and Manufacturers' Association, Dallas; a visit to the Dallas parks, personally conducted by M. N. Baker, vice-president, Dallas Park Board, and another to the Dallas play parks, personally conducted by Myron A. Kesner, supervisor, Play Parks and Recreation, will follow.

First Road Builders' Institute in State of Washington.

On May 1st and 2d county commissioners, county engineers and road supervisors of the state of Washington convened in the Good Roads building at the University of Washington, in Seattle, to participate in the first road builders' institute ever held in the state. Authorities on technical phases of highway construction discussed bridges, pavements, road materials and road plans, and the viewpoints of the state,

the city and the county officials were expressed. The attendance was large and spirited discussions succeeded the reading of each paper.

Eminent engineers in both public and private life addressed the gathering, some informally. Following is the program:

Monday, May 1st—Address of welcome, Dr. Henry Suzzallo, president of the University of Washington; "Road Plans and Specifications," C. R. Ege, Spokane, formerly assistant engineer state highway commission; "Road building materials of the state," Charles E. Weaver, assistant professor of geology, University of Washington; "The County Engineer's Viewpoint," Hans Mumm, Jr., city engineer of Everett; "The Work of the State Highway Department," George F. Cotterill, chief engineer; "Highway Bridges," A. H. Fuller, dean of college of engineering, University of Washington; "The Highway Engineer and the Public," H. W. Boetzkies, assistant state highway engineer; "Brick Roads and Pavements," A. H. Dimock, city engineer, Seattle; "Road Bitumens," Dr. H. K. Benson, professor of industrial chemistry, University of Washington; "Road Work in Snohomish County," R. H. Thomson, consulting engineer, Seattle.

Tuesday, May 2d—"The Contractor's Bond," John M. Wilson, assistant attorney general, state of Washington; "Concrete Pavement," C. N. Reitz,

Reitz, Storey & Duffy, engineers, Seattle; "Mysteries of Concrete Road Construction," W. H. Reed, president State Association of County Commissioners; "Raising Money for Road Building," Frank Terrace; "Tests of Highway Material," Wm. F. Allison, professor of municipal and highway engineering, University of Washington; "Tests of Concrete," Student Thesis, Thomas Driscoll and Henry Zimmerman.

New York City Conference of Charities and Corrections.

The seventh New York City Conference of Charities and Corrections was opened in the assembly hall of the Kings County Medical Society, Brooklyn, May 25. The general subject considered was public health. Addresses were made by Dr. Haven Emerson, commissioner of the department of health of Greater New York, and by Robert J. Wilkin, justice of the Children's Court of Brooklyn, president of the conference. Other addresses included: "Mental Deficiency as a Com-

(Continued on page 880.)

PROBLEMS CITIES ARE STUDYING WITH EXPERTS

The proposed \$3,000,000 Valeria Home development, near Chappaqua, N. Y., is to have a complete and modern system of SEWERAGE and sewage disposal and Hansen & Coulter, 2 Rector Street, New York City, have been retained as engineers.

The question of GARBAGE INCINERATORS is being considered by Rochester, N. Y., and the city has consulted a local engineer, Allen S. Crocker, 55 Plymouth avenue, S., in connection with its investigations.

A system of SEWERS and SEWAGE DISPOSAL for the city of Stuart, Ia., is being designed by Theo. S. DeLay, consulting engineer, of Creston, Ia. The field work is being done by Frank A. Diasda, of Clinton, who recently joined the staff of Mr. DeLay.

An adequate storm water SEWER SYSTEM has been an important problem of Coshocton, O., and John A. Hanlon has been working on it in conjunction with City Engineer Andrew Fisher.

Following the requirements of the State Department of Health, the village of Catskill, N. Y., is designing a new sanitary SEWERAGE SYSTEM and has employed George H. Warner, 488 Main street, Catskill, to make the surveys, maps and specifications.

The village of Monroe, N. Y., is planning a SEWERAGE SYSTEM and has retained Clyde Potts, 30 Church street, New York City, as consulting engineer.

The WATER WORKS system of Ardmore, Okla., is to be improved and extended and the city has appointed Henry Exall Elrod, Southwestern Life Building, Dallas, Tex., as consulting engineer in connection with the work.

Memphis, Tenn., decided in favor of a MUNICIPAL LIGHTING PLANT and retained Frederick W. Ballard, of Cleveland, to conduct negotiations for taking over the property of the Merchants' Power Company, according to the franchise ordinance. Mr. Ballard recommended that the project of purchase be abandoned and that the city build its own plant.

ELECTRIC LIGHTING PLANTS are being planned by the cities of Goodman, Edwards, Flora and Baldwin, Miss. WATER WORKS and lighting plants are proposed improvements for the cities of White Castle, La.; Utica, Miss.; Fairhope, Ala.; Decatur, Ala.; Murray, Ky.; Ville Platte, La., and Georgetown, Miss. The costs of all these projects total \$200,000 and Xavier A. Kramer, Magnolia, Miss., is consulting engineer for all of them.

PERSONALS

Thompson, Silvanus Phillips, noted as an electrical engineer and physicist, and a former president of the Institution of Electrical Engineers, died in London, England, June 14, in his sixty-sixth year. He was widely known for his work in the development of dynamo-electric machines.

Mr. Thompson was born in York and was a graduate of the Bootham School there, the Flounders' Institute of Pontefract, and the Royal School of Mines. He was professor of physics at the University of London, a past president of the Physical Society, the Röntgen Society, the Optical Society, the Illuminating Engineers' Society, the Optical Conference in 1912 and of the Sette of Odd Volumes.

His writings include a life of Michael Faraday and "The Life of Lord Kelvin," in addition to many technical works on electricity, dynamo-electric machinery, and the electromagnet. He was also the author of lectures on light and optical subjects. Mr. Thompson was a member of the Athenaeum Club.

He visited the United States in 1893, when he was received by many scientific societies and delivered several lectures.

Anderson, Andrew, has been appointed chief of the Perth Amboy, N. J., fire department, succeeding Frank Tooker, resigned.

Browder, John H., for 18 years chief of the Montgomery, Ala., fire department, died June 5, aged 51.

Dumphy, Michael, has been appointed an engineer of the Philadelphia, Pa., Water Bureau.

Livingstone, Charles A., has been elected chief of police of Ellwood City, Pa. W. C. Morrison has been appointed assistant.

NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

SEPTIC TANK.

For Institutional Sewage Disposal Systems.

The Dickey "Adj-Cap" septic tank consists of three or more sections of specially prepared vitrified salt-glazed clay pipe. It has clay partitions properly separating the sections and clay covers for the cleanout holes. It is adapted particularly well for use for disposal of sewage of public institutions, such as hospitals, jails and similar places. It is designed for use in connection with either a filter or a sub-irrigation system.

Each section is 2½ feet long and 2 feet inside diameter. Three sections are calculated to care for 50 gallons of sewage per day—or about five people. The tank is designed only for sewage—other waste water running to the irrigation system or outlet. The capacity is adjustable, as many sections as are needed being added.

The first section acts as the sludge tank. The sludge bed is formed at the bottom and bacterial action occurs. The scum is formed by the lighter material and bacterial decomposition of the sewage takes place at the bottom of the scum layer and in the bed. The liquid then flows into the next chamber through the round opening in the vitrified cap or baffle board used as a partition. Very little solid matter passes into this chamber or the next, but whatever does go through undergoes the septic action.

After the liquid leaves the tank, unless a filter is used, it is advisable to run the effluent into 4-inch sewer pipes,

below which is placed drain tile. The liquid seeps from the pipe to a natural filter bed and is picked up by the drain tile and conducted from the soil. This makes an excellent sub-irrigation system for a garden. Immediately above the drain tile at the outlet gravel or cinders should be placed—then earth, and the sewer pipe laid in this earth bed. This makes a good natural filter.

The "Adj-Cap" septic tank, which is shown in the accompanying illustration, is made by the W. S. Dickey Clay Manufacturing Company, Kansas City, Mo.

PUMPING UNITS.

Of Various Types for Small Water Supply Systems.

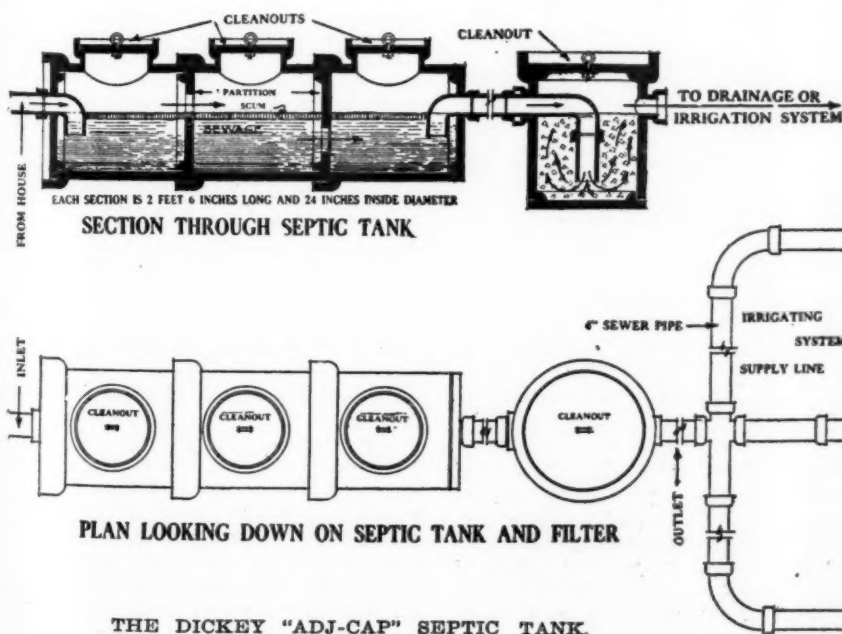
"Standard" pumping units consist of combinations made up of four sizes of gas and gasoline engine pumps of the suction lift type and four sizes of similarly driven pumps of the deep well type. Electric motor pumping units are made with the same size pump frames and cylinders that are used on engine driven units, but have a wider range of motors. Important features of the machines make them especially adapted to service in which the pumping unit takes the water from the source of supply and delivers it directly into pipes for distribution without the use of overhead or storage tank. The capacity of the units limits their use to water supply for small communities or institutions.

The suction lift type unit, engine driven, operates on natural or artificial gas, gasoline, kerosene or alcohol. The

unit is adapted to pump from shallow wells, springs, cisterns, reservoirs, etc. It is not to be placed more than 20 or 25 feet vertical distance above the water, nor more than 1,000 feet from the source of supply. The machine is of simple, rugged and compact construction, the engine having a drop-forged crank shaft and connection rod, heavy, well-balanced flywheels, mechanically operated valves and carburetor with pump and reservoir feed governing the fuel supply. The pump has a brass lined cylinder, brass sleeve over piston rod, brass plungers with cup leathered or square hydraulic packing, brass swing check valves of special design, screwed into cylinder and valve chamber, brass by-pass built into pump, long, adjustable connection rods, machine cut gearing, renewable bronze bushing on all wearing shafts and piston rod. The engine is provided with pulley, and gearing may be disengaged and the engine used without operating the pump. The cooling water connection in the regular unit is made from the valve chamber of the pump. The unit is built in three sizes: two, four and six h.p., with capacities corresponding, 1,350, 2,190 and 4,080 gallons per hour.

The deep well type, engine-driven units are adapted, of course, to a different type of service and they must be placed directly over the well and supplied with a lower cylinder suspended on a drop pipe and having its plunger operated by a suction rod inside of the drop pipe. Provision is made for adjusting the length of the sucker rod to accommodate the position of the plunger in the lower cylinder after the water head is assembled. The units are fitted with differential cylinders proportioned to the size of the lower cylinder so that the load is divided between the up and the down strokes and an even flow of water is obtained at the surface. The discharge of the working head is fitted with a swing check valve, automatic by-pass and an air chamber. The sizes are also two, four and six h.p., and the capacities, 75-ft. well, 1,000, 2,500 and 3,500 gals. per hour.

The same types of pumps may be had for electric operation through direct connection. The drive may be either worm gear or spur gear, the latter for heavier service. The former type units are made in eight sizes, with motors having horsepower ranging from 1 to 7½ and capacities 880, 1,200, 1,900, 2,000 and 4,000 gallons. The spur gear drive unit are made in six sizes, motor power varying from 2 to 7½ h.p. and capacities 1,350, 2,000 and 4,000 gallons per hour.



THE DICKEY "ADJ-CAP" SEPTIC TANK.

These units are installed into water systems of the pneumatic pressure type, in which the pressure of the air and water in the tank is controlled by an automatic switch which starts the motor at low pressure and allows it to operate until the predetermined high pressure is reached, when the switch automatically stops the motor. The supply of air and water enter the tank together through the water discharge pipe and the air compressor is regulated so that the normal balance of air and water is maintained and it is practically impossible for the tank to become filled with water without having sufficient air pressure to deliver it. The engine-driven units are similarly supplied with automatic stopping switch, so that when the pressure reaches any pre-determined point the switch will automatically stop the engine.

The accompanying illustration shows the electric water system using a deep well pump with spur gear drive. The capacities of this system are 1,000, 2,000 and 4,000 gallons per hour, 75-foot well. The systems and units described are manufactured by the Standard Pump & Engine Company, Akron, O.

INDUSTRIAL NEWS

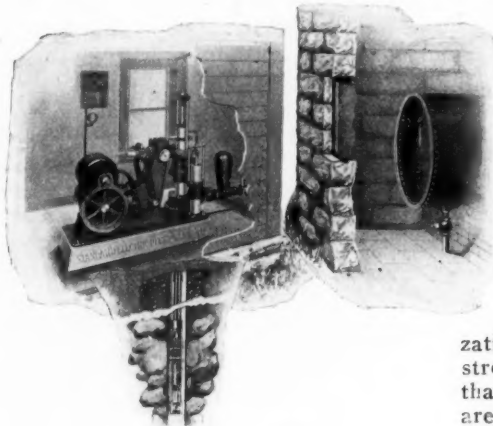
Cast Iron Pipe.—Chicago—The leading interest has been awarded 400 tons of pipe for Decatur, Ill., and is the only low bidder on 1,100 tons at St. Paul. The only important inquiry in sight calls for 800 tons for Kansas City, Mo. Quotations: 4-in., \$33.50 to \$34; 10-in. and larger, \$30.50 to \$31; Class A, \$1 extra. Birmingham—Scattered orders from various parts of the country keep the plants operating at the same capacity as during the past several months. Prices have tended to ease somewhat, but there is no weakness. Sanitary pipe shops are maintaining a good schedule of operations, the best in some time. Quotations: 4-in., \$28; 6-in. and up, \$25; 16-ft. lengths, \$1 extra. New York—No public lettings of importance are announced, but private buying continues in good volume. Quotations: 6-in., Class B and heavier, \$30.50; Class A, \$31.50.

Lead.—Lead is inactive and quotations are being shaded. Quotations: New York, 6.85 cents; St. Louis, 6.70.

"Permutit" Receives the Elliott Cresson Medal.—The Franklin Institute has awarded the Elliott Cresson gold medal for 1916 to Dr. Robert Gans, of Pankow, near Berlin, Germany, for the discovery of "Permutit," a substance which has taken an important place in the domestic and industrial life of the world. This medal and diploma—under the deed of trust of February 18, 1848, from Elliott Cresson to the city of Philadelphia—is awarded annually by the Franklin Institute on the recommendation of its Committee on Science and the Arts, "for discovery or original research adding to the sum of human knowledge, irrespective of commercial

value; or products embodying substantial elements of leadership in their respective classes, or unusual skill or perfection in workmanship." After recommendation and advertising for objections over a period of about three months, the medal and diploma were formally sent to the officials of the Permutit Company of New York City, for forwarding to Dr. Gans when circumstances permit.

"Permutit" is a substance resulting from the fusing together of alumina, silica and an alkali carbonate. Its property is that of interchanging one of its constituents for other elements carried in solution in water passing



ELECTRIC DEEP WELL WATER SYSTEM.

through it. This interchange is automatic and continuous. After the "Permutit" has become exhausted under a complete interchange of elements, it may be regenerated by passing through it another solution which restores the original element. While "Permutit" can be prepared in a number of combinations for extracting from solution various elements, its chief use in the industrial and domestic fields is for softening water. Hard water is water carrying various proportions of lime and magnesium, and prior to the advent of "Permutit" it was exceedingly difficult to extract all these elements by any commercial process so as to leave the water absolutely soft, or of "zero hardness."

That "Permutit" is an industrial fact and not a mere laboratory experimental process is claimed to be proved by the remarkable extent to which it has become established in the past few years. The Permutit Company, 30 East 42nd street, New York City, controls the commercial exploitation of this product; and it reports over 500 industrial plants already established in the U. S. alone, besides hundreds of others in Germany, France and England.

Bitoslag Contract.—The Board of County Commissioners of Allegheny County, Pa., has awarded a contract to the Thomas Cronin Company of Pittsburgh for one and one-half miles of Bitoslag pavement. It was in McKeesport, Pa., which is in Allegheny County, that Bitoslag was laid originally in

1910. The success of the McKeesport pavement, and the success of Bitoslag pavement laid in Philadelphia last year, under heavy traffic, is causing many communities, especially where slag abounds, to look with favor upon this form of pavement.

The Goodyear Tire & Rubber Co., Akron, O., has just issued for free distribution a valuable new booklet on "Goodyear Motor Truck Tires." It is primarily a booklet for truck owners, discussing the factors which are important in motor truck tires, and embodied in Goodyear's product, and illustrates the progress Goodyear has made in the last few years. The recognized advantages of these different types, and the vital factors of low cost per mile, durability, low power consumption, simplicity, traction grip, cushioning effect and minimum weight—all of which enter into the selection of motor truck tires—are freely discussed. Special mention is made of the Goodyear service for truck tire users. Back of Goodyear's line of truck tires is an organization of service stations which stretches across the continent in more than a hundred cities. In each of these are employed experienced workmen who have at their command all the necessary equipment to effect speedy tire application and reduce to a minimum the unemployed moments of the truck. The booklet also contains a list of representative users of Goodyear truck tires in the principal cities, and a list of all Goodyear branches and additional agencies which distribute Goodyear truck tires.

The Asbestos Protected Metal Company, Pittsburgh, Pa., announces that hereafter it will be represented in Cincinnati, Ohio, and surrounding territory by Mr. E. G. Irwin, with offices in the Union Trust Building, Cincinnati.

NEWS OF THE SOCIETIES

(Continued from page 878.)

community Disease," by Dr. Thomas W. Salmon, medical director of the National Committee for Mental Hygiene; "The Care and Prevention of Mental Defectives," by Dr. Bernard Sachs of the mental hygiene committee of the State Charities Aid Association.

At the evening meeting the general subject was education, with an address by Ludwig B. Bernstein, superintendent of the Hebrew Sheltering Guardian Society, and papers on "The Problem of the Truant Child," by Professor Hobart H. Todd, principal of the New York Parental School, and "What Is the Border Line Between Legitimate Vocational Training in a Child-Caring Institution and Institution Industry," by Arthur D. Dean of the state education department. Discussion of these papers was opened by George Chatfield, assistant director of the bureau of research,

board of education, and by Dr. Solomon Lowenstein, superintendent of the Hebrew Orphan Asylum of the City of New York.

On Friday afternoon the conference met in the United Charities Building, 105 East 22d street, Manhattan. The general subject was "Families," with an address by Dr. Thomas J. Riley, general secretary of the Brooklyn bureau of charities. This was followed by papers on "The Family at the Parting of the Ways," by Miss Margaret F. Byington, associate secretary of the American Association for Organizing Charity, and "Dovetailing the Work for the Exceptional Family," by William Vetter, supervisor of the department of family welfare of the Brooklyn Society for the Prevention of Cruelty to Children.

Friday evening the meeting was held in the United Charities Building, Manhattan. The general subject was "Municipal Needs," with an address by Robert S. Binkerd, secretary of the City Club of New York, and followed by papers on "The Importance of Limiting the Height of Buildings," by George McAneny, and "The Gary School Plan as an Important Factor in Solving the Recreational Problem of Children," by John Martin, of the Board of Education. Discussion of these papers was opened by Edward M. Bassett, of Brooklyn, former member of the Public Service Commission, and by Raymond V. Ingersoll, commissioner of parks, Brooklyn.

On Saturday, May 27, the conference held a session in the morning at the New York Catholic Protectory, Bronx. The subject of the morning session was "Children," with an address by Franklin Chase Hoyt, presiding justice of the Children's Court, New York City. Papers were read on "Organized Activities Outside of School," by Dr. C. Ward Crampton, physical director of the board of education, and "Methods for the Treatment of Mental Defectives of the Border Line Type," by Professor Stephen P. Duggan, director of the extension courses of the College of the City of New York.

The subject of the Saturday afternoon and final session of the conference at the New York Catholic Protectory was "Delinquency," and opened with an address by Patrick Mallon, of St. Vincent de Paul Society, of Brooklyn. The papers included: "The Sanction of Law; Are We Drifting from Our Moorings?" by Paul L. Blakely, associate editor of America, and "Sense and Sentiment; How Shall They Be Combined? The Judge's Problem," by Robert H. Roy, county judge of Kings county.

Wisconsin County Clerks Association.

The Wisconsin County Clerks' Association will hold its annual meeting and convention in Superior June 27 to 29. The program will consist of meetings to be held at the Hotel Superior, which will be the convention headquarters in which papers and discussions of topics

of interest to the officials will be read. The program for these meetings has not yet been announced.

Among the other forms of entertainment for the visitors will be an auto ride around the city and vicinity for the visitors and their wives on Tuesday afternoon. At night a banquet will be held at the Commercial club.

On Wednesday afternoon a lake trip on a steel steamer is being planned.

The mornings will be given to the business sessions of the organization.

The officers of the association are: Sanford H. Wood of Baraboo, president; W. J. Leader of Superior, vice president; Russell H. Jones of Kenosha, secretary, and V. P. Rath of Grand Rapids, treasurer. The last meeting of the association was held in Waupaca.

Montana Municipal League.

At a meeting of the executive committee of the league held at Billings May 22, a tentative program was mapped out, November 20-23 set as the date for the annual meeting at Lewistown, and the following committees appointed:

Committee on legislation—J. A. Luce of Bozeman, W. L. A. Calder of Laurel, Edward Horsky of Helena, John Dwyer of Butte, and S. D. McKinnon of Miles City.

Committee on streets and paving—A. C. Burkman of Lewistown, E. N. Sneckenberger of Billings, L. B. Evensen of Great Falls, and Robert Pauline of Kalispell.

Committee on sewage and sanitation—R. R. Purcell of Helena, E. A. Gerhart of Billings, A. J. Fousek of Great Falls, W. M. Bradford of Livingston and P. J. Twohey of White Sulphur Springs.

Committee on water works—C. C. Weidner of Bozeman, F. E. Morse of Kalispell, A. S. Hathaway of Missoula and A. S. Roberts of Three Forks.

Committee on taxation and assessment—W. C. Symmes of Lewistown, H. G. Kremer of Bozeman, T. W. McKinzie of Havre, and D. C. Kenyon of Chinook.

Committee on judicial decisions—F. P. Whicher of Red Lodge, R. N. Jones of Harlowton, J. B. Selters of Big Timber and L. O. Skelton of Boulder.

Committee on municipal franchises—H. J. Heune of Forsyth, E. A. Baker of Glendive, F. H. Grinkenberg of Hamilton, and J. W. Hart of Polson.

Committee on municipal accounting—W. H. Harrison of Great Falls, H. L. Fitton of Lewistown, E. S. Judd of Billings, Walter White of Manhattan and L. Doane Dickson of Columbus.

Committee on municipal ownership—C. H. Mott of Miles City, H. W. Brown of Cascade, Jacob Brown of Virginia City, A. Vaux of Sidney and James Eckford of Choteau.

Committee on parks and playgrounds—C. H. Lane of Butte, D. Sprogan of Belt, Charles Eder of Hardin and A. A. Needham of Whitehall.

Committee on public health—Mayors

of Anaconda, Deer Lodge, Dillon and Bearcreek.

Committee on public safety—J. L. Barston of Baker, William Fitzstevens of Belgrade, O. E. Schoonover of Whitefish and the mayors of Glasgow and Roundup.

State of New York—The Civil Service Commission.

July 15, 1916.

Open competitive examinations for the state service will be held in various cities throughout the state July 15, 1916, for the positions mentioned below:

133. Assistant in Public Records. Division of Archives and History, State Department of Education. \$2,000. Men only. Applicants must be thoroughly familiar with the methods of filing and recording of public papers in State, county, town, village and city offices. They should also have a knowledge of the laws relative to the filing and recording of such papers, together with a knowledge of the construction and equipment of recording offices.

139. Bridge Designer. \$1,501 to \$2,100. Applicants must have had at least five years' practical experience in drafting, designing and constructing structural steel and bridge work. Graduation in engineering from a school maintaining a standard satisfactory to the Commission will be accepted as one year of the required experience. Subjects of examination and relative weights: Questions on graphical and analytical determination of stresses, and the design of trusses and girders, foundations, bearings, etc., 6; experience, education, and personal qualifications, 4. Open to non-residents.

140. Superintendent of Construction. Office of the State Architect. Minimum salary \$1,800 per annum with advancement as the quality of work performed and length of service will warrant. Applicants must have had at least five years of practical experience in building construction as a superintendent of construction for the Federal Government, State or a municipality; or as architect, engineer or owner, or as an architect, engineer or contractor. The subjects of examination and relative weights of subjects as follows: Materials and building construction, including reinforced concrete, metal furniture, plumbing, heating and electric work, and involving extensive knowledge of all materials employed in first class buildings and details of construction, business communications with reference to work under construction and knowledge of details of complete specifications for various work, 6; training and experience, 4. Open to non-residents.

145. Electrical Engineer (Assistant). Public Service Commission, First District. \$1,801 to \$2,400. Appointees to this position will have to handle a considerable amount of work in connection with theoretical computations on the design of electric railroad equipment, and should be thoroughly conversant with and experienced in the design, selection, installation and inspection of electric railroad motors, signals, switching apparatus, etc. Applicants must have had at least ten years' recent experience in construction or operation of power stations and heavy traction systems. Graduation in engineering from a school of the highest grade will be accepted as equivalent to four years' experience. Subjects of examination and relative weights: Written examination, 4; experience, training and personal qualifications, 6. In rating the last mentioned subject an oral examination may be held. Open to non-residents.

Application blanks will not be sent out by mail after July 3. Application blanks received at the office of the commission after July 5 will not be accepted. For application blank address State Civil Service Commission, Albany, N. Y.

ADVANCE CONTRACT NEWS

ADVANCE INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
N. J.	Woodbridge	8 p.m., June 24	Improving Woodbridge Ave.	A. Keyes, Township Clerk.
Ind.	Muncie	10 a.m., June 24	Grading, graveling or macadamizing two roads	F. M. Williams, Co. Auditor.
Wash.	Tacoma	11.30 a.m., June 24	Grading and paving with first class pavement 2.12 miles	County Engineer
Minn.	Little Falls	2 p.m., June 24	Constructing 4 miles of road	E. L. Teachout, City Clerk.
Ky.	Pineville	June 24	Improving several sections of road	W. C. Bingham, Co. Clerk.
N. Y.	Niagara Falls	June 24	Paving several streets and alleys	O. E. Carr, City Manager.
N. J.	Newark	June 25	Grading and paving with brick or asphalt	C. H. Wells, City Engr.
Ind.	Indianapolis	10 a.m., June 25	Reconstructing two roads	L. K. Fesler, Co. Auditor.
Pa.	Washington	June 26	Improving 8.3 miles of road	T. J. Underwood, Co. Control.
La.	Cedar Rapids	June 26	10,000 yds. brick and 24,000 yds. asphaltic concrete pave.	City Clerk
N. Y.	Albany	1 p.m., June 26	Constr. and repairing highways and fur. broken stone	Edwin Duffey, St. Hwy. Comr.
Kan.	Kansas City	June 26	Improving two streets	Frank Holcomb, Co. Clerk.
Cal.	Upland	7.30 p.m., June 26	Grading, curbing and oiling street	C. P. Fuller, City Clerk.
W. Va.	Kingwood	1 p.m., June 26	Grading and surfacing 50 miles with concrete and asphaltic concrete	J. K. Monroe, Dist. Engineer.
Cal.	Sacramento	June 26	14 miles state highway (concrete)	State Highway Commission
O.	Springfield	noon, June 26	8,058 yds. brick pavement	M. J. Bahin, Engineer, D. P. S.
Ind.	Kokomo	June 26	Paving with hard surface pavement	Board of Public Works.
O.	Youngstown	1 p.m., June 26	5,735 ft. of brick road	F. H. Vogan, Clerk, Co. Com'rs.
Ill.	Harvard	1 p.m., June 26	42,560 yds. asphaltic concrete and 2,350 yds. concrete pavement	Board of Local Improvements.
Wash.	Everett	1 p.m., June 26	Constructing two and regrading three roads	Mae Weatherbee, Co. Aud.
Ind.	Gary	June 26	46,500 yds. asphalt, wood, brick or concrete	W. P. Cottingham, Asst. City Engr.
La.	Avoca	1 p.m., June 26	10 blocks curbing and paving with brick and concrete	J. H. Mayne, Engr., Council Bluffs, Ia.
N. Y.	Buffalo	noon, June 26	Laying concrete side and crosswalks in parks for 1 year	J. F. Malone, Com'r of Parks.
O.	Ashland	Noon, June 26	Improving several streets	W. O. Mason, Mayor.
N. Y.	Malone	7.30 p.m., June 26	8,960 sq. yds. brick pavement, 500 ft. sewers and 2,300 ft. concrete curb	S. A. Howard, Court House.
N. Y.	New Brighton	Noon, June 26	2,560 yds. bituminous concrete pavement, laying sidewalks and curbs	Engineer, Bureau of Engineering.
Ind.	Huntington	June 26	Paving streets and laying sidewalks	City Clerk.
Ind.	Indianapolis	10 a.m., June 26	Grading, paving and curbing streets and alleys	Board of Public Works.
Ill.	Cicero	8 p.m., June 26	Paving alleys	Chas. Stoffel, Town Clerk.
Ia.	Oskaloosa	June 26	Paving and improving streets	T. H. Carlin, City Clerk.
Mass.	Becket	1 p.m., June 26	Constructing 1,000 ft. of road	Board of Selectmen
Minn.	St. Paul	10.30 a.m., June 26	Grading, curbing and laying sidewalks	August Hohenstein, Pur. Agt.
N. J.	Camden	8 p.m., June 26	3,900 ft. concrete curb in Pensauken township	J. C. Remington, Jr., Engr., Market St.
Cal.	Berkeley	10 a.m., June 27	Paving with asphalt, and curbing	A. G. Briggs, City Clerk.
Md.	Baltimore	June 27	21 miles of state highways	State Roads Commission.
N. Y.	Endicott	8 p.m., June 27	Paving with brick, concrete or bitulithic (5 blocks)	D. C. Morgan, Village Clerk
O.	Forest	noon, June 27	Grading, draining, curbing and paving streets	C. S. Dome, Village Clerk.
N. J.	Newark	June 27	Paving several streets with Warrenite	Board of Freeholders.
Cal.	Ventura	June 27	8 1/2 miles concrete road	J. B. McCloskey, Clerk, Co. Supervisors.
Md.	Easton	June 27	2 miles state aid highway	F. W. Seth, Co. Rd. Engr.
Ind.	Indianapolis	10 a.m., June 27	Furnishing road machinery; two cars Glutrin binder	L. K. Fesler, Co. Aud.
Ore.	North Bend	8 p.m., June 27	Paving several streets	C. E. Maybee, City Recorder.
Pa.	Apollo	June 27	Paving and curbing five blocks	S. G. McNeese, Boro Secretary
Mo.	St. Louis	June 27	Improving several streets; cost, \$60,000	E. R. Kinsey, Pres. Bd. P. S.
Utah	Salt Lake City	June 27	Concrete and asphalt paving	S. Q. Cannon, City Engr.
Tenn.	Jackson	10 a.m., June 27	54,000 sq. yds. brick pavement	Hu. M. Harris, Comr. of Sts.
Ind.	South Bend	10 a.m., June 27	Grading, curbing and graveling road and constr. walk	Bd. Pub. Works.
O.	Salem	noon, June 27	4,500 yds. brick pavement, 3,500 ft. stone curb and 2,800 cu. yds. of excavation	I. N. Russell, Dir. P. S.
N. Y.	Buffalo	noon, June 28	Grading and constructing walks at Normal School	D. Upton, Prin.
Neb.	Grand Island	8 p.m., June 28	Paving with vertical fiber brick	H. E. Clifford, City Clerk.
O.	Cleveland	Noon, June 28	Paving several streets	Com'r of Engineering
N. Y.	L. I. City	11 a.m., June 28	Grading and paving with sheet asphalt	M. P. Connolly, Boro Pres.
O.	Cleveland	June 28	Improving roads, three jobs; total cost, \$29,000	County Commissioners.
Ont.	North Bay	noon, June 28	50,000 sq. ft. permanent sidewalk	H. J. McAuslan, Town Engr.
Ind.	Indianapolis	10 a.m., June 28	Grading and paving streets	Board of Public Works.
Ind.	Crown Point	8 p.m., June 28	Improving Joliet street	H. V. Parry, City Clerk.
O.	Columbus	2 p.m., June 28	Constructing state highways in several counties	Clinton Cowen, State H. Comr.
N. J.	N. Brunswick	2.30 p.m., June 29	Repairing with bituminous concrete on macadam	Edward Burt, Collector.
W. Va.	Mannington	noon, June 29	Improving 15 miles of road	J. R. Wilson, Engr.
N. Y.	New York	3 p.m., June 29	Constr. cement walk and steps and asphalt tile walks	Dept. of Parks.
N. J.	Woodbury	June 29	Paving and improving streets	Arthur Starr, City Clerk.
N. C.	Henderson	June 29	35,000 ft. concrete curb and gutter and storm drains	Anderson & Christie, Engineers, Wilson, N. C.
N. J.	Elizabeth	2.30 p.m., June 29	Repairing Amiesite roads	J. L. Bauer, Co. Engr.
W. Va.	New Martinsville	June 29	Constructing 15 miles of road	J. R. Wilson, Engr., Mannington, W. Va.
Ia.	Britt	June 29	26,600 yds. of paving and 15,500 ft. of curbing	T. S. DeLav. Engr., Creston, Ia.
Ala.	Centerville	June 29	Grading and graveling road	County Commissioners.
Pa.	Ebensburg	1 p.m., June 29	Two miles brick pavement and 690,000 paving bricks	O. P. Thomas, Co. Engr., Leader Bld., Johnstown, Pa.
Ind.	Evansville	10 a.m., June 29	Grading and paving highway	C. P. Beard, Co. Aud.
Utah	Ogden	10 a.m., June 29	Constr. sidewalks, curbs and gut's and street intersec.	City Engineer.
O.	Columbus	noon, June 29	2,100 ft. road work; cost \$19,000 (at Urbana)	State Highway Commissioner.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Ind.	Winchester.....10 a.m., June	29..14,517 ft. road construction.....	C. E. Tillson, Co. Aud.	
Pa.	Allentown.....10 a.m., June	30..Constructing cement sidewalk at County Home.....	C. J. Dilcher, Co. Controller.	
Ind.	Warsaw.....1 p.m., June	30..Constructing county road.....	V. D. Mock, Co. Aud.	
Wis.	Burlington.....2 p.m., June	30..7,600 yds. of macadam, 8,300 yds. asphaltic concrete, 7,800 yds. of grading and 4,500 ft. cement curb.....	City Clerk.	
Ind.	Rushville.....June	30..7½ miles macadam or gravel roads.....	A. R. Holden, Co. Auditor	
O.	Columbus.....Noon, June	30..Macadamizing and treating with tarvia and liquid asphalt.....	John Scott, Clerk Co. Comrs.	
Mass.	Boston.....noon, June	30..Laying bituminous pavement.....	Park & Recreation Dept.	
O.	Worthington.....noon, June	30..Paving with brick, concrete or bit. mac.....	W. P. Vest, Village Clerk	
O.	Tiffin.....noon, June	30..Macadamizing 1.65 mile of road.....	B. S. Hamilton, Clerk, Twp. Trustees.	
Pa.	East Vandergrift.....June	31..Improving McKinley avenue; cost, \$15,000.....	L. G. Anderson, Boro Engr.	
O.	Ironton.....July	1..2 miles water bound macadam.....	W. H. Crawford, Co. Auditor.	
Ind.	Muncie.....10 a.m., July	1..Constructing gravel and macadam roads.....	F. M. Williams, Co. Aud.	
O.	Newark.....July	1..Grading and paving several streets.....	C. H. Wells, City Engr.	
Ala.	Bay Minette.....July	1..Constructing county highways.....	J. M. Garrett, Co. Engr.	
Ala.	Mobile.....July	1..Constructing Delta highway.....	County Rd. Comrs.	
O.	Maumee.....July	1..20,000 sq. yds. of paving.....	T. N. Dowling, City Clerk	
O.	Painesville.....July	1..Grading and paving 2½ miles with brick; cost, \$15,000.....	C. N. Cummings, Co. Engineer.	
Ind.	Lawrenceburg.....noon, July	1..Grading, draining and macadamizing road.....	H. E. Lutherbeck, Co. Aud.	
Ind.	Jasper.....2 p.m., July	2..Grading, draining and paving three roads.....	Jacob H. Seng, Co. Aud.	
Ind.	Hartford City.....2 p.m., July	2..Furnishing ¾-in. stone for road repairs.....	J. L. McGeath, Co. Aud.	
Ind.	Bloomington.....July	2..Paving streets.....	G. E. Danner, Engineer.	
Miss.	Greenwood.....noon, July	2..Surfacing 100 to 140 miles roads.....	A. R. Bew, Clerk, Co. Supvrs.	
Ind.	Franklin.....2 p.m., July	2..Three miles of gravel road.....	J. C. Gregg, Co. Aud.	
Ind.	Connersville.....1 p.m., July	2..Grading, draining and paving road.....	Glen Zell, Co. Aud.	
Ind.	Hartford City.....July	2..5,700 ft. of road; cost, \$20,700.....	County Auditor.	
Ind.	Jeffersonville.....10 a.m., July	2..Grading, draining and paving road.....	G. W. Stoner, Co. Aud.	
Ind.	Fowler.....1 p.m., July	2..Constructing township road.....	Warren Mankey, Co. Aud.	
Ind.	Brownstown.....2 p.m., July	2..Constr. two mac, three coner. and one gravel road.....	Albert Leudtke, Co. Aud.	
Ind.	Versailles.....1 p.m., July	2..Constructing macadam roads.....	J. F. Lochard, Co. Aud.	
Ind.	Portland.....2 p.m., July	2..Three brick, two gravel and five stone roads.....	John Bonifas, Co. Aud.	
Ind.	Kentland.....1 p.m., July	2..Constructing four macadam roads.....	S. R. Sizelove, Co. Aud.	
Ind.	Greencastle.....2 p.m., July	2..Constructing township road.....	J. M. Allen, Co. Aud.	
Miss.	Macon.....2 p.m., July	2..Three road graders, spreader, heater and road sweeper; asphaltum or Tarvia.....	J. A. Tyson, Chancery Clerk.	
Miss.	Louisville.....July	2..Constructing 54 miles sand-clay road.....	G. E. Hauser, Jr., Engineer, Columbus, Miss.	
Ky.	Frankfort.....July	2..2½ miles macadam road.....	S. B. Smith, Road Engineer.	
Minn.	St. Paul.....10 a.m., July	2..Grading, gravelling and improving roads.....	G. J. Ries, Co. Aud.	
Ind.	Greensburg.....1 p.m., July	2..Constructing township roads.....	J. C. Barbe, Co. Aud.	
Ind.	Paoli.....2 p.m., July	2..Constructing gravel or macadam roads.....	E. A. Palmer, Co. Aud.	
Ind.	Kokomo.....10 a.m., July	2..Surfacing streets with first-class pavement.....	Board of Public Works.	
Fla.	Arcadia.....July	2..561,749 sq. yds. pavement.....	Phil Lacey, Engr., Zolfo, Fla.	
Miss.	Lexington.....July	2..27 miles macadam road.....	Snowden & Hauser, Engrs., Columbus, Miss.	
N. C.	Tarboro.....July	2..10 miles sand-clay road.....	H. S. Bunn, Clerk, Co. Comrs.	
N. C.	New Bern.....July	2..Constructing cement gravel roads.....	H. M. Goves, Co. Aud.	
Ind.	Rensselaer.....2 p.m., July	2..Constructing stone road.....	J. P. Hammond, Co. Aud.	
Ind.	Greenfield.....10 a.m., July	2..Constructing gravel road.....	H. J. Rhue, Co. Aud.	
O.	Mansfield.....July	2..Grading and paving on roads.....	E. A. Merkel, Co. Engr.	
Ky.	Seymour.....July	2..12 miles concrete, macadam and gravel road.....	County Commissioners.	
O.	Dunkirk.....July	2..1½ mile macadam pavement.....	R. R. McElroy, Village Clerk.	
Cal.	Los Angeles.....July	2..60,000 yds. concrete pavement; cost, \$91,000.....	A. M. McPherson, Clerk, Bd. Supervisors.	
Ind.	Decatur.....10 a.m., July	2..Constructing macadam roads.....	T. H. Baltzell, Co. Aud.	
Ind.	New Castle.....10 a.m., July	2..Constructing two roads.....	H. C. Elliott, Co. Aud.	
Ind.	English.....2 p.m., July	2..Constructing township road.....	J. B. Enlow, Co. Auditor.	
Ind.	Brookville.....1 p.m., July	2..Constructing macadam road.....	C. G. Reifel, Co. Auditor.	
Ind.	Danville.....10.30 a.m., July	2..Constructing road.....	C. M. Haven, Co. Aud.	
Ind.	Tipton.....10 a.m., July	2..Constructing gravel roads in two townships.....	Oscar Vanness, Co. Auditor.	
Minn.	St. Paul.....10.30 a.m., July	2..Grading and curbing several streets.....	H. W. Austin, Pur. Agent.	
Ky.	Danville.....7.30 p.m., July	2..7,000 sq. yds. asphalt pavement.....	S. F. Crecelius, Engr.	
Miss.	Winona.....July	2..13 miles macadam or gravel road.....	Snowden & Hauser, Engrs., Columbus, Miss.	
Miss.	Macon.....2 p.m., July	2..Dragging road in county.....	J. A. Tyson, Chancery Clerk.	
Ind.	Columbus.....10 a.m., July	2..Constructing concrete road.....	W. H. Scott, Co. Aud.	
O.	Cleveland.....Noon, July	2..Paving 17 blocks.....	Park Engineer, City Hall.	
Ind.	Crawfordsville.....10 a.m., July	2..Constructing gravel roads.....	Dr. W. F. Batman, Co. Aud.	
Ind.	Lebanon.....10 a.m., July	2..Constructing roads in three townships.....	Cleve Goodwin, Co. Aud.	
Ind.	Shelbyville.....10 a.m., July	2..3 gravel roads, total length 46,325 ft.....	F. W. Fagel, Co. Auditor.	
Ind.	Logansport.....10 a.m., July	2..Constructing township road.....	A. P. Flynn, Co. Auditor.	
Md.	Baltimore.....July	2..25 miles state highway.....	State Roads Commission.	
N. J.	Princeton.....July	2..20,000 sq. yds. asphalt block pavement.....	G. M. Brown, Engineer.	
Ind.	Rockville.....11 a.m., July	2..Grading and gravelling roads.....	Charles Davis, Co. Aud.	
Utah.	Salt Lake City.....July	2..21,000 sq. yds. brick pavement, 12,000 yds. asphalt resurfacing and 10,000 ft. curb.....	Board of Public Works.	
Wis.	Portage.....2 p.m., July	2..Constructing combined curb and gutter.....	Fred Goss, City Clerk.	
Ind.	Goshen.....1:30 p.m., July	2..Constructing brick or other road.....	A. R. Bemenderfer, Co. Aud.	
Ind.	Noblesville.....10 a.m., July	2..Constructing 4 roads.....	W. O. Horton, Co. Aud.	
Ind.	Lafayette.....10 a.m., July	2..2.56 miles gravel road.....	Geo. W. Baxter, Co. Aud.	
Ind.	Covington.....2 p.m., July	2..Constructing gravel road.....	H. W. Newlin, Co. Aud.	
O.	Hamilton.....10 a.m., July	2..Furnishing and placing crushed stone.....	W. W. Crawford, Clerk, Co. Commissioners.	
Ind.	Kokomo.....10 a.m., July	2..20,205 ft. gravel road (two jobs).....	W. L. Benson, Co. Aud.	
Ind.	Corydon.....2 p.m., July	2..Constructing gravel road.....	J. L. O'Bannon, Co. Aud.	
Ind.	Valparaiso.....2 p.m., July	2..Two gravel roads; total length 1.9 mile.....	C. A. Blachly, Co. Aud.	
Ind.	Rochester.....2 p.m., July	2..Constructing seven gravel roads.....	E. A. Smith, Co. Aud.	
Ind.	Plymouth.....2 p.m., July	2..Constructing two roads.....	O. H. Weber, Co. Aud.	
La.	Terrebonne.....noon, July	2..Constructing 11.7 miles sand-clay-gravel roads.....	T. B. Smith, Eng., Houma, La.	
Ind.	Mt. Vernon.....2 p.m., July	2..1,800 ft. stone road.....	J. R. Haines, Co. Auditor.	
Ind.	Monticello.....10 a.m., July	2..Grading, draining and paving road.....	A. G. Fisher, Co. Aud.	
Ind.	Columbia City.....noon, July	2..Grading, drain and pav. with gravel, brick and concr.....	T. A. McLaughlin, Co. Aud.	
Fla.	Lake City.....July	2..21,000 yds. brick or asphalt, 12,000 yds. asphalt resurfacing on macadam; 10,000 ft. of concrete curb.....	C. R. Horne, Engineer.	
Va.	Harrisonburg.....noon, July	2..Laying about 18,000 yds. brick and asph. block pav't.....	City Clerk.	
O.	Wauseon.....July	2..Grading and macadamizing road.....	C. O. Castle, Engr., Court Hse.	
Pa.	Wilkes-Barre.....8 p.m., July	2..Paving with brick and belgian block in Plains township.....	Parson & Morgan, Twp. Engineers, 2d Nat. Bank Bldg.	
Mo.	Fulton.....8 p.m., July	2..2,000 yds. bit. mac. and 1,400 ft. concrete curb.....	S. E. Baker, City Engineer.	
Ind.	Warsaw.....10 a.m., July	2..Constructing gravel roads.....	V. D. Mock, Co. Aud.	
Tenn.	Rogersville.....July	2..90 miles road construction, requiring 500 culverts, 500,000 cu. yds. excavation, etc.; cost, \$450,000.....	S. C. Cornell, Chief Engineer, County Road Commission.	
N. C.	Greenville.....3 p.m., July	2..30,000 yds. first-class pavement, 25,000 ft. granite curb, 20,000 ft. concrete gutters and 1,000 sq. yds. sidewalk.....	G. C. White, Engr., Durham.	
Ind.	Indianapolis.....10 a.m., July	2..Constructing four roads.....	L. K. Fesler, Co. Aud.	
Ind.	La Porte.....10 a.m., July	2..Constructing two roads.....	F. A. Hausheer, Co. Auditor.	

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
O., Cincinnati	July 7	Pav. with coner., asph. coner. or Warrenite; cost, \$80,000.	Albert Reinhardt, Clerk, Co. Comrs.	
Cal., Sacramento	July 10	Paving 7 miles of highway	State Highway Commission.	
O., Alger	July 10	Grading and paving Main street	W. E. Meyers, Engr., Kenton, O.	
Pa., Beaver Falls	July 10	Street paving; cost, \$25,000.	Boro Clerk.	
N. Y., Albany	1 p.m., July 10	Constructing State highways	Edwin Duffey, St. Hwy. Comr.	
O., Jefferson	Noon, July 10	Grading and paving Walnut street	F. G. Brown, Village Clerk.	
Ind., Peru	Noon, July 10	Paving with gravel and concrete	F. K. McElheny, Co. Aud.	
Ala., Dadeville	noon, July 10	Constructing 107 miles of road (two jobs)	County Commissioners.	
Miss., Greenwood	July 10	100 to 140 miles hard surface road; \$600,000 available	County Supervisors.	
Tex., Caldwell	July 10	Sand clay roads; \$20,000 available	C. H. Maljowsky, Engineer.	
Ind., Indianapolis	10 a.m., July 11	Constructing two gravel roads	L. K. Fesler, Co. Aud.	
Ind., Frankfort	2 p.m., July 11	Constructing 2½ miles gravel road	Edward Spray, Co. Aud.	
N. Y., Albany	1 p.m., July 12	Constructing State highways	Edwin Duffey, St. Hwy. Comr.	
Ala., Tusculumbia	July 12	Graveling and grading 8 miles of road	W. S. Keller, State Hwy. Comr., Montgomery.	
N. Y., Albany	1 p.m., July 14	Constructing State highways	Edwin Duffey, St. Hwy. Comr.	
La., Dubuque	8 p.m., July 15	3,400 yds. of macadam, 5,400 yds. of excavation and 1,700 ft. concrete curb	J. J. Shea, City Recorder.	
Ind., Peru	10 a.m., July 29	Constructing gravel and concrete roads	F. K. McElheny, Co. Aud.	
Ill., Springfield	Aug. 11	Curbing and paving with brick; cost, \$75,000.	W. D. Seeley, City Engineer.	
SEWERAGE.				
Ind., Galveston	3 p.m., June 24	Constructing tile ditch (tile furnished)	A. M. Scott, Drain Supt.	
N. Y., Niagara Falls	June 24	Sewers in several streets	O. E. Carr, City Manager.	
N. J., Passaic	10.30 a.m., June 26	2,000 ft. 6 to 12-in. pipe sewer	City Engineer.	
Ill., Cicero	8 p.m., June 26	Constructing tile pipe sewer	Bd. of Local Improvements.	
N. Y., Malone	7.30 p.m., June 26	500 feet sewer	S. A. Howard, Court House.	
Ind., Kokomo	June 26	Constructing 10-in. tile sewer	Board of Public Works.	
La., Bouton	8 p.m., June 26	11,040 ft. 8 to 15-in. storm sewers	M. F. Parks, Town Clerk.	
Ariz., Tucson	June 26	Constructing 17 miles 8 to 20-in. sewers and 3 miles 30-in. outfall sewers	C. K. Clark, City Manager	
N. Y., Rochester	noon, June 27	Constructing sewer	W. H. Wotherspoon, St. Supt.	
Minn., Thief River Falls,	8 p.m., June 27	3,500 ft. 8 to 12-in. sewer	P. W., Albany, N. Y.	
Neb., Aurora	noon, June 27	Constructing one-half-mile storm sewer	A. H. Fasel, City Clerk.	
O., Lorain	noon, June 27	3,525 ft. 12 to 60-in. storm sewer, 9 manholes	G. R. Haworth, City Clerk.	
N. J., Jersey City	June 27	Laying 18-in. vitrified sewer	C. M. Osborn, City Engineer.	
O., Salem	June 27	3,000 ft. of storm sewers	City Commissioners.	
Ind., Peru	7:30 p.m., June 27	Constructing sewers	Director of Public Service.	
Minn., Windom	June 28	Constructing drainage ditch; tile drains to cost \$150,000.	Pleasant Bell, Jr., City Clerk.	
Ind., Indianapolis	10 a.m., June 28	Constructing local sewers	S. A. Brown, Co. Aud.	
Ill., Geneva	8 p.m., June 28	Sanitary sewer system	Board of Public Works.	
N. Y., New York	2 p.m., June 28	Altering and improving receiving basins	W. S. Shields, Engineer, Hartford Bldg., Chicago.	
Minn., Westbrook	8 p.m., June 29	Constructing septic tank and plumbing	Board of Public Works.	
Conn., Greenwich	8 p.m., June 29	Constructing sewage disposal plant	W. E. Mead, Clerk.	
O., Cleveland	Noon, June 29	Constructing sewer	Joint Sewerage Comms.	
Texas, Canadian	June 30	Sanitary sewer system, \$25,000 available	Commissioner of Engineering.	
Ind., Huntington	1 p.m., June 30	Constr. drainage ditch; furn. 6,400 ft. 6 to 14-in. tile	H. E. Elrod, Engr., Southwestern Life Bldg., Dallas.	
Ind., Frankfort	2 p.m., June 30	Constr. tile and c. i. sewers, 6 to 18-in.; cost, \$28,220.	Andrew Kilty, Constr. Comr.	
W. Va., Charleston	noon, June 30	Constructing sewer	R. H. Boynton, City Engineer.	
N. Y., Collingswood	June 1	Constructing storm sewers	J. M. Clark, City Engineer.	
O., Portsmouth	July 1	Sanitary sewer system; cost, \$41,476.	Remington & Vosbury, Engineers, Camden, N. J.	
Minn., Benson	July 1	48 miles drainage ditch; 250 miles 6 to 30-in. tile	Ralph Calvert, Dir. Public Service.	
Mich., Ann Arbor	July 1	Constructing storm sewers	F. B. Gardner, Engineer.	
N. J., Plainfield	July 3	44,077 ft. 8 to 24-in. vitrified sewer, 4,944 ft. 8 to 18-in. c. i. sewer, 112 manholes, 44 flush tanks and sewage pumping station	Manly Osgood, City Engineer.	
Fla., Gainesville	July 3	2½ miles 8 to 12-in. sanitary sewers	J. T. MacMurray, City Clerk.	
Minn., St. Paul	10:30 a.m., July 3	Constructing sewers in several streets	G. H. Cairns, Engineer.	
Pa., Johnsbury	July 3	Constructing disposal plant and laying trunk sewers	H. W. Austin, Pur. Agent.	
Pa., Wilkes-Barre	8 p.m., July 6	Constructing storm sewer in Plains township	E. M. Wallis, Boro Secy.	
Ind., Poland	noon, July 7	Septic tank and water system at school building	Parson & Morgan, Twp. Engineers, 2d Nat. Bank Bldg.	
La., Spencer	July 7	Constructing sewers in several streets	A. F. Kattman, Trustee.	
Minn., Wadena	8 p.m., July 10	33,300 ft. 6 to 12-in. sewer, 105 manholes disposal plant, pump and chemical equipment	E. O'Keefe, City Clerk.	
Ill., Salem	July 15	Sewer system and disposal plant, cost \$50,000.	A. C. Murray, Village Rec'd'r.	
La., Mapleton	July 15	Constructing sewer system; cost, \$30,000.	City Clerk.	
La., Charter Oak	July 16	Sewer construction, cost \$25,000.	City Clerk.	
Fla., Miami	Aug. 3	8 to 18-in. sewers, \$25,000 available	B. H. Klyce, Engr.	
WATER SUPPLY.				
W. Va., Charleston	June 25	Improving water plant	W. Va. Water & Elec. Co.	
Ky., Louisville	2 p.m., June 26	Setting fire hydrants in 30 places	Board of Public Work.	
Ill., Cicero	8 p.m., June 26	Constructing water supply pipe	Bd. of Local Improvements.	
D. C., Washington	10.30 a.m., June 26	Wrought iron and steel pipe and fittings and soil pipe	Pur. Officer, Panama Canal.	
Ark., Harrison	3 p.m., June 26	Concrete reservoir, pipe lines, pumps, etc.	W. O. Galbreath, Cons. Engr.	
La., Postville	8 p.m., June 26	3,325 ft. 4-in. water mains, gates and hydrants	Wm. Shepherd, Town Clerk.	
Neb., Pallasde	7 p.m., June 26	Furn. power and pump. water; tapping and laying mains	C. C. Hamilton, Village Clerk.	
La., Shreveport	10 a.m., June 26	Laying 11,890 ft. 6 to 12-in. c. i. pipe (city furn. m't'r's)	City Engineer.	
Ill., Dunning	10 a.m., June 27	Extending water mains at State Hospital	Dr. G. Leininger, Managing Officer.	
N. J., Newark	1.30 p.m., June 27	Water supply for almshouse	F. A. Phelps, Union Bldg., Newark, Arch. & Engr.	
Wis., Shawano	June 27	Constructing dam and power house	Power Engineer's Co., Minneapolis, Minn.	
B. C., Vancouver	June 28	75,000 ft. 6 to 12-in. lap-welded steel pipe	James Stuart, City Pur. Agt.	
La., Oakdale	June 28	Pumping plant and distribution system	X. A. Kramer, Engineer, Magnolia, Miss.	
Que., Saint Hyacinthe	June 28	Gravity filters; cost, \$75,000.	A. Messier, City Clerk.	
Mich., Menominee	2 p.m., June 29	Constructing filtration plant and two turbine-driven pumps; total capacity, 3,000,000 gals.	Burns & McDonnell, Engrs., Interstate Bldg., Kansas City, Mo.	
La., Ankeny	2 p.m., June 30	Waterworks system with tank and pump; cost, \$10,000.	A. L. Stebleton, Town Clerk.	
O., Barnesville	June 30	Elevated steel tank, pumping station and rapid sand filters, \$25,000 available	J. W. White, City Clerk.	
N. Y., Troy	July 1	Concrete gate house and 24x16-in. reducer	A. E. Roche, City Engineer.	
Miss., Macon	July 3	Remodeling water works at jail	J. A. Tyson, Chancery Clerk.	
Ont., Toronto	noon, July 4	Furnishing 8-in. water meter	Works Department.	

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
O.	Middletown.....	noon, July	5..Connecting 12 wells, laying 122 ft. 30-in pipe; construct-	City Commissioners.
N. Y.	Walden.....	5 p.m., July	6..Reconstructing 300-ft. dam 10 ft. high.....	Alexander Thomson, Jr., En-
Cal.	Lindsay	Noon, July	7..Constructing 37 wells and pumping plants, 9 miles wood	gineer, Newburgh, N. Y.
			stave pipe, 3 1/4 miles 60-in. concrete pipe, 85 miles steel	
			pipe and 12 miles concrete ditch, with pumps, etc.....	S. E. Kieffer, 57 Post St., San
				Francisco.
O.	Columbus.....	noon, July	7..25,000,000-gal. steam turbine centrifugal pump.....	G. A. Borden, Pres. Bd. Pur.
Cal.	Los Angeles.....	2 p.m., July	10..Furnishing water pipe	H. J. Leland, County Clerk.
D. C.	Washington.....	July	10..Furnishing 353 tons c. i. pipe and specials.....	District Commissioners.
Neb.	Bellwood	noon, July	12..Constructing waterworks system.....	J. P. Delaney, City Clerk.
Mont.	St. Ignatius.....	July	18..Constructing and laying 3,570 ft. concrete pipe line,	
			2,560 sq. yds. pavement and 8,000 yds. excavation....	U. S. Reclamation Service.
N. C.	Wilmington....	10 a.m., July	19..Furn. 500 water meters; painting stand pipe.....	T. D. Meares, City Clerk.
Neb.	Wahoo	2 p.m., July	26..225 h. p. engine and direct-connected generator, 25 h. p.	
			motor and triplex pump.....	H. M. Robertson, Supt. W. & L.
MISCELLANEOUS.				
Conn.	Bridgeport ...	Noon, June	24..Constructing municipal ice plant.....	Board of Contract & Supply.
D. C.	Washington.....	June	24..Two 350-h. p. boilers and steel stack.....	Bureau of Yards and Docks.
Tex.	Balmorhea	June	24..270,000 yds. excavation and embankment, 4,000 cu. yds.	
			concrete and 22,000 yds. dry paving.....	W. W. Stewart, Secy. Irriga-
				tion District.
N. D.	Minot	8 p.m., June	26..One motor-driven sprinkler and power flusher.....	A. D. Hagenstein, City Clerk.
Minn.	St. Paul	10.30 a.m., June	26..Furnishing boiler, valves, fittings, etc.....	August Hohenstein, Pur. Agt.
Minn.	Duluth.....	11 a.m., June	26..Furnishing automobile truck	W. A. Borgen, City Clerk.
N. Y.	Buffalo.....	2 p.m., June	26..Furn. and placing 1,400 tons rip-rap stone at Toledo....	Lighthouse Inspector.
Ind.	Peru	June	27..Collecting and disposing of garbage.....	P. L. Bell, Jr., City Clerk.
Ind.	Portland	1.30 p.m., June	27..Cleaning and repairing drainage ditch.....	Fred Rowls, Township Trus-
				tee, Center, Ind.
D. C.	Washington....	10 a.m., June	27..Furnishing concrete mixer	Sam'l McGowan, Paymaster-
				General, U. S. N.
N. Y.	Brooklyn.....	10 a.m., June	27..Garbage incinerator, electric wire, etc.....	Navy Pay Office.
Mo.	Kansas City....	2.30 p.m., June	27..10.78 miles levee work, requiring 51,000 sq. yds rock	
			paving and 1,200,000 yds. embankment.....	Brooks & Jacoby, Engrs.,
				Shubert Bldg.
Ind.	South Bend.....	1 p.m., June	28..Cleaning and repairing two ditches.....	C. N. Longley, Twp. Trustees.
D. C.	Washington.....	June	28..Lamp posts, cable, fixtures, etc.....	Pur. Officer, Panama Canal.
Mass.	Boston.....	noon, June	28..Constructing municipal building	R. A. Lynch, Supt. of Public
				Buildings.
N. Y.	New York.....	11 a.m., June	30..1 to 1,000 1 1/2-ton and 1 to 1,000 3-ton motor trucks....	Depot Quartermaster, Army
				Bldg.
Ind.	Indianapolis....	10 a.m., June	30..Fire protection for Court House.....	L. K. Fesler, Co. Aud.
Siam	Bangkok.....	Aug.	1..Furnishing suction or hydraulic dredge.....	Director General, Royal Irri-
				gation Dept.
Ind.	Sullivan	2 p.m., July	1..Levee work, including 70,000 sq. yds. concrete facing, 85,-	
			000 cu. yds. excavation and 880 cu. yds. concrete footing....	G. C. Greater, Engineer.
Ind.	Kentland.....	July	1..23 miles drainage ditch construction.....	Ross Lucas, Com'r, Morocco
				Ind.
Ariz.	Douglas.....	July	1..Collecting and disposing of garbage.....	City Clerk.
O.	Tiffin	10 a.m., July	1..Constructing concrete retaining wall.....	J. E. Hershberger, Co. Aud.
Tenn.	Memphis	July	3..Furnishing wire, cable and rubber hose.....	U. S. Engineer Office.
Tex.	Fort Worth	10 a.m., July	3..Repairing and constructing levees and cleaning channels....	District Engineer.
O.	Cleveland	Noon, July	5..Constructing concrete swimming pool.....	Park Engineer, City Hall.
Tex.	Beaumont	10 a.m., July	5..Freight handling machinery	J. G. Sutton, City Secy.
N. J.	Newark	8.30 p.m., July	6..One automobile complete.....	A. Archibald, City Clerk.

STREETS AND ROADS

Huntsville, Ala.—Madison county have sold \$50,000 of county road warrants to the Farmers' Loan & Trust Co., of New York, at par, with interest at 4 1/2 per cent. per annum. Money will be expended in improvements on the roads.

Phoenix, Ariz.—The commission has postponed awarding the contract for paving West Roosevelt St. and North Central Ave.

Los Angeles, Cal.—Ordinances have been passed authorizing the repairing of several streets and construction of sewers.

Los Angeles, Cal.—The ordinance providing for improvement of Sunset Drive has been repealed.

North Stockton, Cal.—Several streets are to be improved and plans and specifications have been drawn up.

Sacramento, Cal.—Salmon River road is soon to be completed, survey is being made of the last incomplete link. The improvement of J St. has been ordered.

Sacramento, Cal.—Four sections of the state highway have been laid out, board having approved engineer's plans for construction of these roads. The sections of road are Loleta to Beatrice, Humboldt County, 4.32 miles; a section in Contra Costa County from southerly boundary to Richmond, 2.55 miles; a strip of road between Beresford and Redwood City in San Mateo County, a distance of 4.24 miles, and reinforced concrete bridges over Salt Creek and the Sacramento River in Shasta County. The section of road laid out in San Mateo County is last uncompleted bit of highway between San Francisco and San Jose.

Sacramento, Cal.—City Council has ordered the improving of several streets.

Stockton, Cal.—Several streets are to

be improved by grading, curbing and paving.

Brookland, D. C.—It is recommended that the following streets be improved. They are: 13th St. from Rhode Island Ave. to Monroe St.; Lawrence St. from 13th to 17th St.; Irving St. from 13th to 17th St.; 8th St. from Kearney to Monroe St.; 9th St. from Kearney to Monroe St.; 10th St. from Irving to Jackson St.

Pittsfield, Ill.—The matter of construction of a system of hard roads connecting all cities and villages of the county is under consideration.

Springfield, Ill.—A brick pavement will be laid in North Grand Ave. from 11th to 15th St. at an estimated cost of \$11,644.63.

Waukegan, Ill.—Bids on Sand St. improvement have been rejected and will be readvertised.

Boonville, Ind., July 3, 1916, at 10 a. m., by treasurer of Warrick county, for sale of \$2,600 highway improvement bonds, 4 1/2 per cent, 10 years. Wm. H. Putler, treasurer.

Evansville, Ind., June 24, 1916, at 10 a. m., by treasurer of Vanderburgh county, for sale, at public auction, of \$4,800 and \$4,400 highway improvement bonds, 4 1/2 per cent, 10 years. Newton Thrall, treasurer.

Greencastle, Ind., June 24, 1916, at 1 p. m., by treasurer of Putnam county, for sale of \$26,600 and \$3,800 highway improvement bonds, 4 1/2 per cent, 10 years. H. H. Runyan, treasurer.

Indianapolis, Ind.—Property owners living on Delaware St. are opposed to new curbing. They suggest that the old curbing be repaired.

Monticello, Ind., July 1, 1916, at 10 a. m., by treasurer of White county, for sale of \$17,100 and \$12,800 highway improvement bonds, 4 1/2 per cent, 10 years. O. C. Middlestadt, treasurer.

Muncie, Ind.—Ten roads have been ordered sold in July, as follows: James J. Jester road, Center township; Homer C. Bird road, Center township; Charles M. Austin road, Center township; A. M. Klein road, Center township; George W. Ford road, Center township; Hughey Haughey road, Center township; Robert Parkinson road, Mt. Pleasant township; Perry Miller road, Mt. Pleasant township; Hershell V. Jeffrey road, Mt. Pleasant township; James F. Janney road, Mt. Pleasant township.

Noblesville, Ind., June 24, 1916, at 11 a. m., by treasurer of Hamilton county, for sale of \$8,380, \$3,220, \$2,920, \$9,000, \$3,320, \$2,760, \$3,400, \$3,500 and \$2,740 highway improvement bonds, 4 1/2 per cent, 10 years. L. G. Heiny, treasurer.

Plymouth, Ind., July 15, 1916, at 2 p. m., by treasurer of Marshall county, for sale of \$15,700, \$12,000 and \$6,200 highway improvement bonds, 4 1/2 per cent, 10 years. George W. Huff, treasurer.

Portland, Ind., June 20, 1916, at 10 a. m., by treasurer of Jay county, for sale of \$12,200 highway improvement bonds, 4 1/2 per cent, 10 years. S. W. Kuder, treasurer.

Rolling Prairie, Ind., June 21, 1916, at 2 p. m., by trustee of Kankakee township, Laporte county, for sale of \$19,999.95 highway improvement bonds, 5 per cent, 15 years. Geo. Fargher, trustee.

Salem, Ind., June 20, 1916, at 1.30 p. m., by treasurer of Washington county, for sale of \$7,600 and \$6,040 highway improvement bonds, 4 1/2 per cent, 10 years. Otto C. Zink, treasurer.

Scottsburg, Ind., June 15, 1916, at 10 a. m., by treasurer of Scott county, for sale of \$16,000 highway improvement bonds, 4 1/2 per cent, 10 years. Hugh Colvin, treasurer.

Shelbyville, Ind., June 24, 1916, at 10 a. m., by treasurer of Shelby county, for sale of \$13,320 highway improvement

bonds, 4½ per cent, 10 years. S. A. Brown, treasurer.

Cedar Falls, Ia.—Concrete pavements about the city are to be repaired.

Waterloo, Ia.—See "Sewerage."

Wichita, Kan.—Ordinances have been passed providing for the widening of Bort Ave.

Legrange, Ky.—Time has been extended for receiving bids on inter-county road.

Louisville, Ky.—Samuel T. Mann, city engineer, reported to the New Albany board of public works an estimate of cost of proposed resurfacing of Pearl St. from Main to Spring Sts., and Market St. from Pearl to Bank Sts. Estimates on Pearl St. are: Wooden block, \$5 a ft.; new brick \$3, and asphalt over the old brick, \$3, and on Market St., wooden block, \$6.50; brick, \$3.90, and asphalt over old brick, \$3.90. Other estimates on improvements submitted by the city engineer were the alley between Center and Constitution Sts., \$1.66; Washington St., from Main to Water Sts. with 26-ft. brick roadway and 5½-ft. granitoid pavement, \$4.38 a ft., and pavement on west side of E. 5th St. from Main to Water, \$1.37 a ft.

Ludlow, Ky.—Paving is held up on account of legal action regarding ordinance.

Bangor, Me.—Petitions have been received for concrete sidewalks on several streets. The committee on streets has been authorized to purchase between 20,000 and 30,000 gallons of road oil from the Standard Oil Co., to be used on the macadamized roads.

Elkton, Md.—June 23, the Cecil County Commissioners will open bids for road bonds, amounting to \$40,000 of \$500 each, and to bear five per cent. interest.

Lovell, Mass.—Seven thousand dollars is to be borrowed for the purpose of widening School St. and a portion of Mammoth road, and the construction of a new bridge.

North Adams, Mass.—The county commissioners have received from state highway commissioners a plan of river road between Clarksburg and this city, which was taken over by the state highway commission at the request of selectmen of Clarksburg.

Pittsfield, Mass.—It is the purpose of the city to improve the principal streets.

Bay City, Mich.—Several streets are to be improved by paving and construction of sewers.

Saginaw, Mich.—Miller St. is to be paved from Webster to Bond St. by day labor at an estimated cost of \$1,800.

Saginaw, Mich.—Board of estimates have approved of issuing \$33,000 emergency bonds for repairing and improving Mackinaw bridge, and disapproved of issuing \$55,000 emergency bonds for repairing Bristol bridge; \$15,000 was voted for the repair of Bristol bridge.

Wyandotte, Mich.—Bonds amounting to \$80,000 will be issued for street paving.

Kulfe Falls, Minn.—Board of Supervisors have appropriated \$400 to be used on the improvement of Vibert road to Saginaw. Cloquet Commercial Club have offered a like amount, making a total of \$800 to be used on this work.

St. Paul, Minn.—Several streets are to be improved by paving and curbing.

St. Paul, Minn.—Several sidewalks are to be relaid, some with brick and some cement.

Gulfport, Miss.—Bonds to build a shell road from Bay St. Louis to Pearl river, near Logtown, and the building of a bridge across Pearl river, connecting up with the highway now being built from New Orleans to the gulf coast have been recommended.

Starkville, Miss.—An election will be held June 27th to determine whether bonds shall be issued for good roads.

Carthage, Mo.—A sidewalk of sawed limestone will be laid on the west side of Forest St.

Cartersville, Mo.—Donations are asked for the paving of Main St.

Kansas City, Mo.—Thirteenth St. is to be widened to Benton Blvd.

Joplin, Mo.—The paving of Main St. from 10th to 20th with wood blocks is under consideration.

Kansas City, Mo.—McGee road is to be repaired and will be paid for by the city.

Billings, Mont.—Curbs and sidewalks have been ordered constructed in the North Elevation sub-division, on South 32nd St. between 4th and 6th Aves. and in several other parts of city. Curbs have been ordered constructed on South 30th St., on Burlington Ave. and in several other sections of the city.

Dillon, Mont.—A sum of \$3,000 has been raised by popular subscription for construction of a road from Bannack to Dillon by way of Grasshopper creek from Ryan's canyon. The matter has been placed before board of county commissioners, who have had the matter under advisement for some length of time. It is the plan of those interested in the road to have necessary work performed by convict labor.

Bayonne, N. J.—Fifty-fourth St. is to be paved with asphalt, with a new concrete base. Bids are to be advertised for on reimpovement of West Eighth, East 22nd and First St., and Ave. C, from 54th St. to Canal bridge. Repaving is to be done.

Camden, N. J.—An ordinance has been passed directing the paving of Cramer St. from 26th to 30th St.

Camden, N. J.—Several streets will be repaved and improved.

Elizabeth, N. J.—An appropriation of \$1,500 has been made for the paving of Monroe Ave., from Anna to Meadow Sts.

Keyport, N. J.—Bituminous concrete is to be used in the construction of new 3-mile road on the Keyport-Middletown turnpike. Work of cementing Broad St. from railroad tracks south to borough limits will soon be begun.

New Brunswick, N. J.—Somerset County Board have appropriated \$5,000 toward improvement of roads.

Passaic, N. J.—Sheet asphalt or granite pavement with a concrete base is to be used to pave Delaware Ave. between Bloomfield Ave. and Willett St.

Plainfield, N. J.—Board of Freeholders have appropriated \$5,000 for the repair of roads.

Plainfield, N. J.—A petition has been presented to the Common Council asking for the improvement and macadamizing of Capner St. to cemetery. It was voted to survey street from Park Ave. to first gate of cemetery and secure an estimate as to probable cost of grading and macadamizing.

Plainfield, N. J.—East Second St., between Netherwood Ave. and Terrill Rd., is to be improved.

Toms River, N. J.—A crushed stone road is to be built at the cost of about \$2,000.

Dunkirk, N. Y.—A contract has been signed for the improvement of the Lake road from Dunkirk to Silver Creek.

Fulton, N. Y.—The board of public works have purchased \$800 worth of oil to be used on city streets.

Johnson City, N. Y.—By an arrangement entered into between the Binghamton Railway Co., Endicott, Johnson & Co. and the State Highway Department the stretch of Johnson City-Endicott highway from Erie House in East Union to Riverside Drive, at Johnson City boundary, will be paved with concrete. The railway company and shoe factory will pave 19 feet in center of road, while State will take care of eight feet on either side, making a roadway 35 feet in width.

Lockport, N. Y.—Bacon and Michigan streets are to be improved by paving. Pound St. is to be graded, curbed and paved and city clerk will soon advertise for proposals.

Rome, N. Y.—The common Council have held a special meeting to take action on paving several streets, repairing the City Hall.

Schenectady, N. Y.—Ordinances have been passed directing the repairing of sidewalks on several streets.

Syracuse, N. Y.—Bids for resurfacing Owasco-Auburn road and Moravia-Niles roads have been advertised. The specifications provide for 2½ ins. of bituminous macadam.

Syracuse, N. Y.—The double tracking of the street car line in Euclid Ave., widening and paving the street, and construction of first of proposed new 17th ward sewers has been provided for by action of the Common Council.

Syracuse, N. Y.—The resurfacing of pavement in Walton St. from South Clinton to South Franklin St. has been ordered on the adoption of an ordinance.

Walden, N. Y.—Street committee is considering the purchase of signs "Keep to the right," for regulation of traffic on several streets. A petition has been presented to the board asking for construction of concrete sidewalks on both sides South Montgomery St.

Brevard, N. C.—Citizens are desirous of having a road across Blue Ridge.

Dunn, N. C.—The Cape Fear Bank has closed a deal for \$55,000 improvement bonds.

Morganton, N. C.—City council is

going to extend concrete street paving on two principal streets, and about two miles of cement sidewalks, six feet wide, will be put down.

New Bern, N. C.—Trent Rd. is soon to be paved with Lillington gravel. County auditor has been authorized to advertise for bids to be opened the first Monday in July.

Wadesboro, N. C.—Advocates of good roads in Mecklenburg, Union, Anson, Richmond and Moore Counties are carrying on an aggressive campaign with the object of connecting the gap between Charlotte and Pinehurst on the Wilmington, Wadesboro, Charlotte, Pinehurst to Asheville highway.

Winston Salem, N. C.—There are good prospects that Liberty St. will be paved in the near future.

Coshocton, O.—An ordinance providing for paving of Bank St. has been passed. An ordinance authorizing issuance of \$1,500 in bonds for paving of alley from Chestnut to Locust St. between Second and Third Sts. has been passed.

Coshocton, O.—The widening of 12th St. is at a standstill until July appropriations.

Geneva, O.—Roads in the township are being repaired and put in first-class condition.

Hillsdale, O.—It is expected that the contracts will be let in a few days for the construction of trunk line road from Hillsdale to Pioneer, O.

Ironton, Ohio.—There is to be a new road constructed over the hill; the Hanging Rock and Chesapeake roads will soon be advertised.

Ironton, Ohio.—City Council has ordered paving of many streets.

Marion, Ohio.—Bonds amounting to \$60,000 will be issued for the improvement of 5 miles of road on La Rue-Richwood Rd.

Marietta, O.—Resolutions have been adopted for improvement of several streets by paving.

Middletown, Ohio.—Lemon township will construct a new road leading from Manchester pike to Middletown Franklin pike at a cost of about \$6,300.

Piqua, Ohio.—Bonds amounting to \$207,531.90 for street paving will be issued.

Sandusky, O.—Ordinances have been passed providing for the improvement of several streets.

Youngstown, O.—Several streets are to be paved and sewers will be constructed.

Youngstown, Ohio.—Streets are to be improved by paving and construction of sewers.

Creswell, Ore.—Improvement of roads and streets is being considered by the council.

Beaver, Pa.—An ordinance providing for the paving, grading and parking of Seventh Ave. has been passed and bids will be advertised for at once. An ordinance for grading Tank alley is under consideration.

Chester, Pa.—Several streets will be improved with modern materials in various parts of the city.

Erie, Pa.—A petition has been received asking for the opening of Ash St. to the Wattsburg plank road, also from 28th St. to southern city line.

Erie, Pa.—It has been proposed to extend Ash St. to southern city limits. Bids for cement walk on Lake road will be received June 23.

Hazleton, Pa.—The Lehigh Traction Co. will pave its section of Broad St. with wood block.

Hazleton, Pa.—The paving of several streets is under consideration; city engineer has been authorized to prepare plans and specifications.

Philadelphia, Pa.—Ordinances providing for the improvement of several streets have been passed.

Wilkes-Barre, Pa.—An ordinance has been passed providing for the paving of Wyoming St. between North and Olin Sts.; also improving Miner road between Wilkes-Barre city boundary line and the boundary line of Miners Mills, and George Ave., between Miners road and Main St.

Williamsport, Pa.—Ordinance for paving Packer St. between Brandon Park and Market St. has been repealed.

Chattanooga, Tenn.—The citizens of James County will vote on a \$25,000 road bond issue Aug. 8.

Park City, Tenn.—A petition has been given to the city council asking the paving of East Fifth Ave., the cost of which will be investigated.

Beaumont, Tex.—Commission has ordered Auditor to advertise for 2,400 cu.

yards oyster or mud shell for construction of road.

Corpus Christi, Tex.—An election will be held July 8 to decide upon the issue of bonds amounting to \$150,000 for street paving and improvement work.

Corpus Christi, Tex.—Election is called for July 8 to vote on bonds amounting to \$150,000 for paving.

Corsicana, Tex.—Council has referred the paving of West Ninth Ave. between 15th and 18th Sts. to a special paving committee.

El Paso, Tex.—Myrtle Ave. is to be paved with bitulithic. The following petitions have been granted: Property owners on Hueco St. for paving of that street from Estrella to Stevens with bitulithic; property owners on 2d St. for bitulithic paving from Chihuahua to St. Vrain; property owners on Leon St., from district No. 1 to 2d St. for bitulithic paving.

Galveston, Tex.—The improvement of Ave. O, from 23d to 35th Sts., is under consideration.

Harre, Va.—It has been decided to construct a sidewalk on Commonwealth Ave., cost not to exceed \$200.

Portsmouth, Va.—At a meeting of the road and bridge commission of Norfolk county, the question of improving roads running into Portsmouth was discussed. The discussion of the road question resulted in adoption of a motion that the commission confer with street and finance committees of Portsmouth city council with a view to procuring co-operation on part of city in building the roads which run into the city.

Centralia, Wash.—Streets will be improved by paving at an estimated cost of \$14,403.80.

Spokane, Wash.—Plans and specifications for grade, curb and sidewalk on Madison St. from Sinto to Augusta Ave. have been passed by city council. The improvement will cost \$3,200.

Spokane, Wash.—\$100,000 Montana municipal bonds and \$25,000 Lewistown paving bonds have been purchased by Ferris & Hardgrove.

Janesville, Wis.—Construction of Janesville-Beloit concrete highway is under consideration.

Racine, Wis.—The paving with brick of several streets is under consideration.

Superior, Wis.—Logan Ave. is to be paved with concrete about 3 miles, thus making good roads to Swedish, Norwegian and Jewish cemeteries.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates contracts awarded.)

Pomona, Cal.—*Paul E. Conner, for improvement of several streets, at \$8,578.73.

Sacramento, Cal.—*Clark & Henery Construction Co., for improvement of several streets.

Sausalito, Cal.—For paving and improving North St., bids as follows: *Western Motor Draying Co., \$5,123.43; Blake Bros., \$5,482.31; L. L. Page, \$5,355.66; engineer's estimate, \$5,436.16. Central Ave.: *Western Motor Draying Co., \$8,020.70; Blake Bros., \$8,397.09; L. L. Page, \$8,082.86; engineer's estimate, \$9,017.20.

Stockton, Cal.—*Paul & Caldwell for paving several streets at \$10,959.60.

Wilmington, Del.—*Walter French for resurfacing the county road to Price's Corner, to Oak Hill and to Kennett tpk.; *The U. G. I. Co., of Philadelphia, for repairs and resurfacing of roads from Odessa to Boyd's Corner to Pine Tree and Middletown to Mt. Pleasant.

Palatka, Fla.—*Georgia Engineering Co., for brick paving and cement work on hard roads in District No. 2, at approximately \$7,900 per mile.

Sanford, Fla.—Bids received for brick pavement, Southern Clay Mfg. Co., Chattanooga, Tenn.; Wilson Construction Co., Jacksonville, Fla.; Augusta Vitrified Shale Brick Co., Augusta, Ga. G. R. Ramsey, highway engineer.

Pittsfield, Ill.—*Cameron, Joyce & Co., of Keokuk, Ia., for the construction of the Griggsville-Perry state aid road, at a cost of \$15,676.72. The same concern constructed the state aid road leading east from this city.

Springfield, Ill.—Contracts for state aid work were awarded by the state highway commission as follows: Pike county, sec. B, macadam, *Cameron, Joyce & Co., Keokuk, Ia., \$15,676.72. Knox county, sec. B, bridges, *Cameron, Joyce & Co., Keokuk, Ia., \$17,891.49. Livingston county, sec. B, oiled earth, *L. S.

Kuhn, Bloomington, Ill., \$12,001.19. McDonough county, sec. E, bridges, *Miller & Husband, Springfield, Ill., \$4,090. Clinton county, secs. B-C, oiled earth, *Van Dusen & Baumberger, Greenville, Ill., \$8,925.74. McHenry county, sec. H, gravel, *James B. Wright, Harvard, Ill., \$11,799.34. Cook county, sec. K, concrete, *Peter Simons, Quincy, Ill., \$16,484.35.

Sterling, Ill.—*Kelley Bros., Morrison, for paving Lincoln Way to east end of county, at \$50,960.45. *Conductive Paving Co., Forest Park, for paving with brick Second Ave., Sixth Ave., East Second St. and Third St. at \$106,503.37.

Sterling, Ill.—Bids received for 42,661 sq. yds. brick block pavement, concrete foundation, as follows: Conductive Paving Co., Forest Park, Ill., \$107,503.31; Wilson & Thatcher, Chicago, Ill., \$109,776.60. Edward O. Hills, City Engineer.

Waukegan, Ill.—*Waukegan Improvement Co., \$5,900, for paving with concrete of a portion of Commonwealth Ave. south of Twenty-second St. The contract provides for paving 15 ft. of the street on either side of the electric railroad. Planks will be laid between the rails.

Boonville, Ind.—*Martin & Martin of Evansville for the Randolph McCool rock road in Boon township for \$4,620; Thomas & Thomas, of Mt. Vernon, for Fisher road in Greer township for \$2,165.

Columbus, Ind.—Bids were opened for the construction of the Scheidt, Krause (Concrete) Thompson and Stewart roads. The Thompson road includes the improvement of some city streets, and it also has a bridge over Haw creek. The low bid on Krause road was that of Masters Construction Co., \$43,372. The same company has the low bid on Scheidt road, \$39,324. Moor & Crise submitted the only bid on Stewart road. The bids were as follows: Krause road—George T. Miller, \$44,947; Masters Construction Co., \$43,372; James De Gallyer, \$44,774. Scheidt road—George T. Miller, \$41,847; Kent Construction Co., \$41,964; Masters Construction Co., \$39,324; Everett Burns & Co., \$42,496; James De Gallyer, \$39,915. Stewart road—Moor & Crise, \$6,450. Thompson road with steel bridge—Montgomery Barber Co., \$49,699; Meredith & Hallway, \$49,750; Albert Harman, \$49,850; Moor & Crise, \$48,997. Thompson road with concrete bridge—Montgomery Barber Co., \$48,265; Albert Harman, \$47,848.75; Moor & Crise, \$49,600. It is probable that Mr. Harman will be given contract for Thompson road and bridge. The contract for Stewart road will be let shortly also. Mr. Masters, of Seymour, will, without doubt, be given the Krause and Scheidt roads.

Linton, Ind.—*The Indiana Refining Co. has been awarded contract for oiling the streets of Linton.

Muncie, Ind.—The board of works have received bids and made preliminary orders for the paving of following streets and alleys: High St. from Charles to White river, excepting from Jackson to Washington St.; asphalt. Washington St. from High to Mulberry Sts., asphalt. Gilbert St. from High to Walnut Sts.; asphalt. Adams St. from High to Walnut Sts.; asphalt. Howard St. from High to Madison Sts.; asphalt. Alley between Adams and Jackson from Plum to Vine Sts.; concrete; Alley between Vine and Plum Sts. and from Gilbert to within 125 feet of Washington St.; asphalt. Alley between Vine and Plum Sts. and from Wyss to Gilbert Sts.; concrete.

Muncie, Ind.—For improving Liberty St. from 12th St. to Lake Erie & Western tracks, macadam roadway with curb and gutter, *W. B. Birch Co. Second St. from Macedonia Ave. to Walnut St., macadam roadway with curb and gutter, *W. M. Birch Co.; Howard St. sidewalk, north side from Proud St. to first alley east, *W. M. Birch Co. Sixth St. sewer from Plum to Monroe St., *W. M. Birch Co. The bids received for sidewalk on east side of Macedonia from Ninth St. to Ohmer Ave., exceeded the estimates and city clerk was ordered to readvertise for bids.

Richmond, Ind.—Bids for oiling streets received as follows: Indian Refining Co., \$0.475 per gal.; Standard Oil Co., \$0.519. Approximately 25,000 gals. will be used.

Shelbyville, Ind.—*Shelbville Street Sprinkling Association, for oiling streets at 4 cts. per sq. yd.

Washington, Ind.—*Wm. Avery Waldron, Ind., at \$8,625, for construction of road for Washington township, Decatur county.

Louisville, Ky.—*Samuel T. Games, of Louisville, for construction of the Silver Hills road, at \$11,899. The proposed improvement extends from the Old Vin-

cennes road at end of Cherry St., over Silver Hills, to the Main St. road.

New Orleans, La.—Bids for the construction of a new roadway leading from the New Orleans public cotton warehouse have been opened. The proposed roadway extends 3,200 ft. from the warehouse, and its construction is expected to improve traffic conditions to a marked degree.

Bangor, Me.—*Small & Ingalls for construction of macadam paving on Main St.; \$29,000 will be spent.

Dorchester, Mass.—Bids received for granite block and Hassam block pavement, Alexander St. from Bird St., about 527 ft. northerly: *James Doherty, granite pitch joints, \$7,641.71; granite grout joints, \$7,472.75; Hassam block, \$7,679.35. Other bids: Jeremiah J. Sullivan, \$8,540.40, \$8,540.40 and \$8,547.40; Simpson Bros. Corp., \$9,560.92, \$9,080.72 and \$8,690.12. Engineer's estimate, \$7,097.

Ann Arbor, Mich.—Bids received by Manley Osgood, city engineer, for paving Catherine St. and Miller Ave., from Main to Seventh St. Approximate quantities: 4,100 cu. yds. excavation, 61,100 lin. ft. concrete curbing, 6,100 lin. ft. stone curbing, 1,800 cu. yds. concrete foundation, 300 lin. ft. stone headers, 11,700 sq. yds. brick paving; engineer's estimate, excavation 50 cts. per cu. yd.; concrete curbing, 35 cts. per lin. ft.; concrete foundations, \$4 per lin. ft.; stone headers, 50 cts. per lin. ft.; brick paving, \$1.25 per sq. yd.; total, using concrete curbing, \$26,160; A. H. Prange, excavation, 58 cts. per cu. yd.; concrete curbing, 40 cts. per lin. ft.; stone curbing, 58 cts. per lin. ft.; concrete foundation \$4.10 per cu. yd.; stone headers, 54 cts. per lin. ft.; brick paving, \$1.29 per sq. yd.; total, using concrete curbing, \$27,453; *Barnes & O'Neil, 50 cts., 35 cts., 70 cts., \$4.10, 70 cts., \$1.25, \$26,400; Ladue & Scotten, 50 cts., 45 cts., 53 cts., \$3.90, 60 cts., \$1.30, \$27,205; W. J. Clancy, 60 cts., 35 cts., 70 cts., \$5.10, 60 cts., \$1.30, \$29,165; Benj. Douglas Const. Co., 65 cts., 37 cts., 72 cts., \$5.23, 58 cts., \$1.31, \$29,827. Also for repaving Liberty St.: Approximate quantities: Old paving removed, 1,710 sq. yds.; excavation, 480 cu. yds.; curbing reset, 705 lin. ft.; concrete foundation, 350 cu. yds.; stone headers, 152 lin. ft.; brick paving 2,100 sq. yds.; engineer's estimate, old paving removed, 10 cts. per sq. yd.; excavation, 60 cts. per cu. yd.; curbing reset, 25 cts. per lin. ft.; concrete foundation, \$4 per cu. yd.; stone headers, 60 cts. per lin. ft.; brick paving, \$1.30 per sq. yd.; total of bid, \$4,856.45; A. H. Prange, 8 cts., 58 cts., 30 cts., \$4.10, 44 cts., \$1.29, \$4,837.58; *Barnes & O'Neil, 11 cts., 60 cts., 27 cts., \$4.25, 70 cts., \$1.30, \$4,990.35; Ladue & Scotten, 25 cts., 50 cts., 30 cts., \$3.90, 60 cts., \$1.30, \$5,065.20; W. J. Clancy, 65 cts., 65 cts., 25 cts., \$5.10, 60 cts., \$1.30, \$6,205.95; Benj. Douglas Const. Co., 75 cts., 65 cts., 27 cts., \$5.25, 58 cts., \$1.31, \$6,461.51.

Escanaba, Mich.—Bids received for 19 miles macadam road: Delta Contracting Co., Escanaba, at \$5,250 per mile.

Nashua, Minn.—*James Jackson, to lay four blocks cement sidewalks.

Swatara, Minn.—Bids received for 1 mile road work: *Morgan & Fletcher, Emily, Minn., at \$900; *E. R. McPhutten, Hay Point, Minn., at \$745.

Macon, Miss.—*Owens Construction Co., Brookville, Miss., for road construction in District 5, Noxubee Co., at \$20,000.

Kansas City, Mo.—*Michael Ross, for grading and macadamizing of Woods Chapel road at \$73,952. Road is 5 miles long.

Sedalia, Mo.—Bids received on 5,375 sq. yds. concrete pavement as follows: Lee Carpenter, local, \$1.0975 per sq. yd.; Joe W. Menefee, local, \$1.10 per sq. yd. F. T. Leaming, City Engr.

Butte, Mont.—*Lindlay B. Phillips for the construction of all cement crossings, curbs, sidewalks, etc., for a period of two years. The construction of a cement sidewalk in the northern part of the city on Montana St., opposite the Stoller building, the repair of bridges in the southern part of the city, and the installation of other cement sidewalks is under consideration.

North Platte, Neb.—*Gerald V. Stack, Denver, Colo., for paving several streets at \$104,000.

Belvidere N. J.—Appropriation of \$46,500 to help meet cost of improving 23 miles of road from Port Colden to Phillipsburg and Belvidere to Phillipsburg has been made by the Warren County Board of Freeholders. *Salmon Bros. of

Netcong, N. J.—Following are repairs to be made: Springfield Ave., *C. H. Winans Co., \$13,412; Edgar road, \$16,389.45; West Grand St., \$5,827.50; *Weldon Contracting Co., Springfield Ave., Summit, \$1,995; Central Ave., \$4,290.40; Shunpike road, \$1,995; Springfield Ave., \$2,560; Seven Bridge road, \$972.70; Terrill road, \$1,194.78.

Morristown, N. J.—All bids for Hanover-Whippany road have been rejected and will be readvertised to be opened July 25.

New Brunswick, N. J.—Bids have been received for construction of section 4 of Woodbridge-New Brunswick turnpike as follows: Thomas F. Dunigan, Woodbridge, \$106,284; Liddle & Pfeiffer, Perth Amboy, \$109,654.48.

North Arlington, N. J.—Bid received for concrete sidewalk: Charles Corrado & Co., local, at \$3,063.05, for 4,200 lin. ft.

Passaic, N. J.—Bids for ten roads have been received and contracts will be awarded and work begun within two weeks.

Perth Amboy, N. J.—Bids for paving Herbert St. with bituminous pavement have been received as follows: Meagher & Smith, excavation, 75 cts. per cu. yd.; concrete, \$6 per cu. yd.; new curb, 75 cts. per lin. ft.; bituminous pavement, \$1.45 per sq. yd.; Standard Bitulithic Co., 77 cts., \$6.75, 90 cts., \$1.75; East Jersey Contracting Co., 70 cts., \$6, 70 cts., \$1.29; Liddle & Pfeiffer, 82 cts., \$6.25, 82 cts., \$1.20.

Albany, N. Y.—The following proposals have been opened at state highway department for improvement by state aid, of Orange county highways: Road No. 95-A, Middletown, 0.11 miles—Schunne-munk Cons. Co., Highland Mills, \$1,532.60; Nash & Griffin, Norwich, \$1,802; Fallkill Cons. Co., Poughkeepsie, \$2,020. Road No. 499, Middletown-Montgomery, 9.18 miles—Frank Salvucci, West Hurley, \$101,370.50; Edward P. Arbogast, Stroudsburg, Pa., \$105,037; John A. Jova, Inc., Newburgh, \$114,842. Road No. 1329, Goshen village, 3.70 miles—Wm. J. Kidd, New York City, \$47,269.75; John S. Turner, Mt. Vernon, \$53,938.75; Abner M. Harper, Inc., Newburgh, \$54,684.50; Schunne-munk Cons. Co., Highland Mills, \$57,333.50; Fallkill Cons. Co., Inc., Poughkeepsie, \$62,768.35; Sewage Disposal & Water Plant Co., Schenectady, \$63,160.

Batavia, N. Y.—*Thomas Holahan of Rochester, for paving Ellicott St. with brick at \$51,156.50 and Lincoln Ave. with asphalt at \$4,391.

Cape Vincent, N. Y.—*H. P. Burgard Co., Buffalo, 15 miles state road.

Norwich, N. Y.—Bids received for 3,500 sq. yds. bituminous macadam pavement as follows: F. D. Griffin, local, at \$7,776; T. A. Bushley, local, at \$7,688.75.

Penn Yan, N. Y.—*The Atlanta Construction Co., of Atlanta, N. Y., for construction of road in Western Yates county a distance of nearly 10 miles, beginning at the Gorham-Rushville highway at the Ontario county line in Rushville, thence on the town highway toward Potter, through Middlesix to Overackers Corners. Water bound macadam will be used for most of the road. Additional property for making the course more direct has been acquired by county. The bid was \$89,424.50, well under the state's estimate.

Port Jervis, N. Y.—*Port Jervis Construction Co., for 5,500 sq. yds. brick pavement, concrete foundation, at \$13,592. Other bidders: Wm. J. Collins, at \$16,276; Fallkill Construction Co., Poughkeepsie, at \$13,737.

Rome, N. Y.—*Warren Bros. Co., for improving and paving eight streets, at \$60,911.02.

Charlotte, N. C.—*John W. Haas, for paving of alleyway in rear of Buford and Central Hotels, at \$1,417.45. Other bidders were: A. H. Gulon & Co., \$1,554; Blankenship & McClelland, \$1,444.50; D. B. Stearns & Son, \$1,650.

Minot, N. D.—*Hanson & Okes, Sioux City, Ia., for construction of 24,000 sq. yds. bitulithic paving and 2,700 sq. yds. creosoted wood block paving. E. J. Thomas is City Engr.

Columbus, O.—Sealed proposals will be received until June 30 for \$98,000 road improvement bonds. John Scott, Clerk of Board.

Hamilton, Ohio.—*Vernon Hughes, concrete retaining wall at the Clawson-Hughes-Bramble farms, Union Twp., \$1,149; *John Conrad, concrete steel bridge at the Stevens-Smith farms, Rely Twp., \$2,481.50.

Niles, Ohio.—Bidders for Second St. paving: James DeJute of Niles, \$8,251.46, and the V. Olson Construction Co., of Youngstown, \$11,030.07.

Port Clinton, Ohio.—*Weis Bros. & Burman, Elmore, O., for building 9½ miles of stone road.

Springfield, O.—*W. F. Payne for improving streets in Northern Heights at between \$3,000 and \$10,000.

Beaver, Pa.—*J. G. McGuire Co., New Brighton, for improvement of Junction Rd., with vitrified block pavement 22 ft. wide, at \$28,744.

Harrisburg, Pa.—Atlantic Refining Co. will probably be awarded the contract for paving.

Harrisburg, Pa.—Juniata Co., Philadelphia, for 2.75 miles of reinforced cement concrete 16 ft. wide on Sec. 4 of State highway route 131, in Birmingham Twp., Delaware County, at \$47,566.14. *Sutton & Corson Co., Ocean City, N. J., for four miles of 16-ft. pavement, reinforced cement concrete, on Sec. 9 of State Highway route 131, in East Nottingham and West Nottingham Twp., Chester County, at \$61,040.15. *J. G. McGuire Co., New Brighton, for one mile of vitrified block pavement, 22 ft. wide, in Rochester Twp., Beaver County, at \$28,744.53. *Paul J. Snyder & Co., Philadelphia, for 4,390 ft. of bituminous paving, amiesite, in Whitemarsh Twp., Montgomery County, at \$15,502.53. Bids were requested on a section of vitrified block pavement, 18 ft. wide, 4,250 ft. in length, in Nether Providence Twp., Delaware County, but none was received.

Johnstown, Pa.—*John Best & Sons, for paving, as follows: Bradley Alley, Front St. to Second Ave., \$1,491; Bradley Alley, Fifth Ave. to Sixth Ave., \$1,464; Blenny Alley, D St. to G St., \$1,505; Brallier, Second Ave. to Third Ave., \$1,464; Boyle, Broad St. to Bradley Alley, \$1,453; Boyle, McConaughy St. to Bradley Alley, \$1,447; Conrad, Sherman St. to Grant St., \$1,405; Bell, Messenger St. to Golde St., \$1,526; Fourth Alley, Ohio St. to Village St., \$1,544; Hahn, Franklin St. to Kennedy Ave., \$1,612. Streets to be paved with asphalt, with the cost per sq. yd., as follows: Oak St., Messenger to Golde, \$1,947; Oak St., Golde to Cedar, \$1,949; Wood St., Cedar to Golde, \$2,134; Wood St., Golde St. to Solomon Alley, \$2,119; Garfield St., Chandler to Butler, \$2,257; Jacoby St., Homestead Ave. to Purse Ave., \$2,242; Homestead Ave., Bedford to Jacoby, \$2,096. The only contract for brick paving on concrete base is on Laurel avenue, from A street to Harrison St., at \$2,219 a sq. yd.

Philadelphia, Pa.—Bids have been received on road and bridge work and contracts will be awarded shortly.

Wilkes-Barre, Pa.—*P. J. Boyle Construction Co., for constructing 3.2 miles Hillside-Huntsville County road, at \$54,378.19.

Norfolk, Va.—*Lawson Construction Co., for concrete curb and gutter and sheet asphalt pavement on Shirley and Spotswood Aves. *Fuda & Harden, to furnish the department of health with 3,000 death certificates. *John D. Westbrook, Inc., to furnish the water department with one Barrett jack.

Portsmouth, Va.—*J. U. Aldenbrook's Son, Inc., for 8,000 sq. yds. of granolithic sidewalk in Port Norfolk at 86 cts. per sq. yd.

Richmond, Va.—*A. J. Billings, at \$4,936.75, for laying sidewalks on both sides of Robinson St., from Broad to Cary.

Grafton, W. Va.—Bids received for 1,300 sq. yds. brick pavement: *W. P. Withers, local, at \$1.88 per sq. yd. Other bid, George Williams, local, \$2.08 per sq. yd.

Parkersburg, W. Va.—*W. C. Peters, of Marietta, for paving 17th St., St. Marys Ave. to Latrobe St.; Oak St., 17th St. to 21st St.; 16th St., Spring St. to St. Marys Ave.; 24th St., Dudley Ave. to Avery St.

Goldendale, Wash.—Bids received on 14,240 sq. yds. natural rock and gravel pavement: *The H. L. Wilson Co., Walla Walla, Wash., \$18,336; Porter Bros. Co., Portland, Ore., \$18,844.58; O. N. Patton, Portland, Ore., \$18,748.95. Lyman W. Ward, County Engineer.

Olympia, Wash.—Bids received for 6.8 miles gravel pavement as follows: J. E. Cunningham, Spokane, at \$7,344; H. C. Root, Spokane, \$7,616; Oregon Road Oiling Co., Spokane, \$8,092; Carlson Chindahl Co., Spokane, \$10,200.

South Bend, Wash.—*T. H. Cochran & Sons, St. Johns, for construction of highway No. 5, about two miles long, at \$20,900.

Spokane, Wash.—*C. H. Green of Spokane, for 50 miles of road improvement in Yellowstone county, Montana, to cost \$167,000. The road work will be done on the trans-continent highway which passes through Billings and is a part of the northern automobile route from Chicago through Spokane to Puget Sound.

Sultan, Wash.—Bids received for 8,000 sq. yds. one course concrete: Grant & Irving, Everett, Wash., \$11,399.10; Grays Harbor Construction Co., Everett, Wash., \$12,590.87. Same firms for paving 16 ft. strip in center of street, combined bids: \$21,329.97 and \$22,448.02, respectively. Snohomish County pays for the 16-ft. strip.

Vancouver, Wash.—*O. D. Wolfe, Washougl, for construction of highway No. 3A, including river road near Camas, at \$7,896.50; *Federal Construction Co., two roads, at \$7,998.20 and \$7,619.10.

Jonesville, Wis.—*Brown & Connors, for asphalt macadam pavement on Oakland Ave. and Forest Park Blvd: The contract bid using Bermuda was \$16,175.30, compared to \$15,847.52 using Aztec; \$16,136.98, Scarco-A, and \$15,414.08 with Scarco-B, a Mexican asphalt. Other bidders were P. W. Ryan & Sons, local; Gund-Graham Co., Freeport, and John O'Gava, Chicago, Ill.

Superior, Wis.—Following were the bids for construction concrete pavement: Tower & Ogden and Fourteenth and Belknap—Anderson & Co., \$2,012.09; Magnus Peterson, \$1,540.87; Russell Construction Co., \$1,602.54; *John Diffor, \$1,531.49. Tower and Banks, and Sixth and Seventh—Anderson & Co., \$1,260.16; Magnus Peterson, \$1,016.41; *John Diffor, \$991.78; Russell Construction Co., \$1,068.82. Tower and Banks, and Fourteenth and Belknap—Anderson & Co., \$2,011.12; Russell Construction Co., \$1,650.92; *John Diffor, \$1,531.41; Magnus Peterson, \$1,540.70.

Superior, Wis.—Bids for paving Robertson Ave. received as follows: Russell Construction Co., \$6,603.15; Magnus Peterson, \$7,769.58, and the Palmer Construction Co., \$8,400.83.

West Allis, Wis.—Bids received for 6,369 sq. yds. concrete pavement: A. E. Retzlaff, Milwaukee, \$1.28 per sq. yd.; Charles J. Moritz, West Allis, \$1.29 per sq. yd.; Gumz, Gutkuncht & Wusson, Milwaukee, \$1.45 per sq. yd.; Dean Construction Co., Milwaukee, \$1.37 per sq. yd.; Koenig Construction Co., Milwaukee, \$1.29 per sq. yd.

SEWERAGE

Birmingham, Ala.—An ordinance has been passed providing for the construction of sanitary sewers in several streets.

Los Angeles, Cal.—See "Streets and Roads."

Los Angeles, Cal.—Election for sewerage treatment bonds, June 6, did not carry.

Stockton, Cal.—The commissioners will purchase ten acres of land from Tuxedo Land Co. for the purpose of installing a sewerage disposal plant.

Washington, D. C.—(Foreign Trade No. 21,545).—A firm in Argentina wants to receive catalogues, quotations and agency offers from American manufacturers of excavating machinery, centrifugal and diaphragm pumps for drainage, centrifugal and air-pressure pumps for irrigation, armored cement silos, stump-pulley machinery and automobiles.

Springfield, Ill.—A 12-in. vitrified crock pipe sewer will be laid in Reservoir St. from 14th to 15th St. at an estimated cost of \$364.11.

Brazil, Ind.—Several streets are to be improved by the construction of the Houk Sanitary Sewer System.

Shelbyville, Ind.—Sewer committee has been instructed to investigate defective sewerage in Montgomery St. and to repair same.

Williamsport, Ind.—June 21, at 1 p. m., by auditor of Warren county, for sale, \$4,896 ditch bonds. D. H. Moffitt, auditor.

Waterloo, Ia.—Contracts for sewerage system for Galloway, Westfield and Hagerman additions, the pavement of a number of streets and construction of several miles of cement sidewalks will soon be awarded.

Wichita, Kan.—Storm sewer No. 14 is to be constructed; also Nos. 13 and 20.

Lexington, Ky.—J. M. Duff, of Cleveland, a contractor, has been in Lexington



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THE joints of this brick pavement were filled with cement. On a hot day the bricks expanded, an irresistible force met an almost immovable obstacle and finally the pavement bulged upward with a snap and a shower of broken brick. Repairs will be difficult. There will be an unsightly scar in the pavement and there is nothing to insure its not happening again.

The advocates of cement filler admit the necessity of providing somehow for expansion and contraction and they attempt

to meet it by calling for special expansion joints to be filled with a bituminous filler. Such expansion joints are good—but why not use pitch as a filler and have *every* joint an expansion joint?

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THE PATERSON MANUFACTURING COMPANY, Limited:				Montreal	Toronto	Winnipeg	Vancouver
St. John, N. B.				Halifax, N. S.	Sydney, N. S.		

to look into the details of the letting of the contracts for main outfall sewer on June 20. Mr. Duff has done some big sewer work in Louisville, and came to Lexington from Dayton, O., where he put in a bid on a large contract last week.

Biddeford, Me.—Mayor Girard has been authorized to have a survey made in regard to extending new sewer on Lafayette St. across Pool, so as to give people in vicinity of that street a chance to connect with new sewer and do away with cesspools. The Mayor said that it was thought at first that it would cost about \$1,100 to put in sewer on Lafayette St., but street Commissioner Gilpatrick now believes it can be done for \$900.

Boston, Mass.—Public Works Department contemplates the construction of thirteen sanitary sewers at approximately \$46,326.

Fitchburg, Mass.—State board of health is looking over plans for sewerage disposal, including probable cost.

Bay City, Mich.—See "Streets and Roads."

Duluth, Minn.—Sanitary sewers have been ordered in 102nd alley, from McGonagle to House St.; in House St. to Commonwealth Ave.; in 60th Ave. West, from block 68½, West Duluth, Sixth Division, to 61st alley west, and in 61st alley to lot 17, block 5, Central Division, West Duluth.

St. Paul, Minn.—City Council has been petitioned to lay sewer system in St. Anthony Park.

St. Paul, Minn.—Sewers are to be constructed on a number of streets.

Hardin, Mont.—There is to be a special election July 10 to submit the question of bonding the sewer for construction of a complete new sewer system.

Grand Island, Neb.—Storm sewer construction is again under consideration.

Kearney, Neb.—A special election will be called to vote on \$50,000 storm sewer bonds.

Camden, N. J.—Ordinances have been passed authorizing the construction of sewers, culverts or drains, on several streets.

Camden, N. J.—An ordinance authorizing the construction of sewers, culverts or drains in and along Tremont, Alberta, Federal, Elm and Ninth Sts. has been passed.

Passaic, N. J.—A sanitary sewer is to be constructed on Mineral Spring Ave. and Delaware Ave.

Perth Amboy, N. J.—A petition has been received for a sewer in upper State St.

Buffalo, N. Y.—The commission suggests that the city build three plants, two on the west side and one on the south side, for the treatment of sewage according to the Imhof system. It is estimated that the cost will be over \$3,000,000 if these plans are adopted.

New York, N. Y.—Sewers at an estimated cost of \$170,000 will be installed on First Ave. from 95th St. to 106th St., and in E. 96th and 102d Sts., from the Harlem River to First Ave.

Syracuse, N. Y.—A new ordinance declares intention to order the construction of sanitary and storm water sewers in Lombard and other streets. There will be a 20-inch sanitary and 36-inch storm water sewer in Lombard St. from Maple St. to Bastable St. The route will then be in Bastable St. 480 feet, across right of way to Ellis St., and south to East Genesee St. One branch will extend in Cumberland Ave. across right of way to Westmoreland Ave., across right of way to Fellows Ave., across right of way to Allen St. and in Allen St. to Clark St. The route is laid out to provide proper grade and to serve streets east of Westcott Ave.

Hamilton, Ohio.—The construction of sanitary sewers in several streets is contemplated.

Middletown, O.—Grand Ave. from Wilson St. to Wicoff St. must have a new sewer in accordance with plans and specifications.

Springfield, O.—Bids received on construction of Rose St. and Clifton Ave. storm sewer have again exceeded engineer's estimate. It is probable reestimate will be made.

Springfield, O.—Estimates will be started at once on construction of a large sewer.

Youngstown, Ohio.—See "Streets and Roads."

Youngstown, O.—See "Streets and Roads."

Chester, Pa.—A sewer is to be constructed on West Ninth St. from Palmer St. to Highland Ave.

Lebanon, Pa.—The construction of a larger storm sewer in Ninth St. is under consideration.

Philadelphia, Pa.—An intercepting sewer is to be constructed along Frankford Creek; bids will also be received for construction of some old sewers. Work will cost about \$35,000.

Park City, Tenn.—City council has ordered several sewer connections on side streets to be made.

Kenedy, Tex.—Sewer bonds are to be issued for \$6,000.

Burlington, Vt.—The matter of installing a sewer at Whiting's brush factory on lower Pine St. is under consideration.

Sheboygan, Wis.—A catch basin is to be installed on corner of Mehrrens Ave. and North Thirteenth St. Pipe sewers are to be constructed on several streets.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates contracts awarded.)

Stockton, Cal.—*Fred Leffer for construction of 12-in. sanitary sewer on North El Dorado St. at \$2,476.60.

Stockton, Cal.—Bids for construction of a 12-in. sanitary main sewer on North El Dorado St. from Sonoma Ave. to Wyandotte St. are as follows: Clark & Henery, \$12,298.40; Federal Construction Co., \$13,716.23; Paul & Caldwell, \$10,959.60; City engineer's estimate, \$12,398.18. Bids for street work: Chambers & Heafey, \$2,746.62; W. S. Gauze, \$3,043.90; Whitlock & Gorrall, \$3,468.40; Frank C. McIntire, \$2,748; W. F. Edwards, \$2,869; L. T. McFadden, \$2,879; Fred Leffer, \$2,475.10; City Engineer's estimate, \$3,205.05.

Bridgeport, Conn.—Bids have been received for construction of sewer on Anson St. as follows: *B. D. Pierce, Jr., Co., \$1,343.50; Pierce Manufacturing Co., \$1,365; Burns Co., \$1,742; Bridgeport Sewer Construction Co., \$1,921. Bids on Gurdon St. sewer: *Pierce Mfg. Co., \$623.25; B. D. Pierce, Jr., Co., \$658.10; Burns Co., \$729; Bridgeport Sewer Construction Co., \$780.50.

Waukegan, Ill.—H. C. Patterson has submitted a bid on laying sewer in Liberty St.

Logansport, Ind.—Bids received on construction of southeast district sewer. M. H. McGovern, Chicago, \$318,519; The Inland Construction Company, St. Louis, \$317,156, and the Independent Construction Co. of Terre Haute, \$314,987.

South Bend, Ind.—Bids received on vitrified sewer, High St. and Honey Ave.: 1,110 feet 18-in.; 1,000 feet, 15-in.; 900 feet 12-in.; 250 feet 10-in.; 550 feet 8-in.; 2,272 feet 6-in. pipe, as follows: Staples & Ackerman, \$6,884.50; De Peake & Cousens, \$8,814.30; L. H. Webster, \$7,246.20. 81 manholes at \$350; flush tanks at \$150.

South Bend, Ind.—Bids received for sewer connections, 1,184 feet 6-in. vitrified pipe, De Peake & Cousens, at \$1,313.40.

Marshalltown, Ia.—*Anderson & Emple, for about 10,000 lin. ft. of sanitary sewer extensions; estimated cost, \$6,500.

Brighton, Mass.—Bids were received for Gaffney St. and Gaffney St. outlet pipe sewers and drains: *John J. Lano, \$4,282.70. Other bids: Anthony Baruffaldi, \$4,432.30; J. H. Ferguson, \$4,568.91; James Driscoll & Son Co., \$4,640.05; N. De Sisto, \$4,839.30. Engineer's estimate, \$4,166.70.

Brighton, Mass.—Bids received for pipe sewers and drains, Foster St., Cleveland Circle and Chestnut Hill Ave.: *M. H. Loonie, \$997.50. Other bids: Anthony Baruffaldi, \$1,190; George J. Regan, \$2,035; Frank Drinkwater, \$3,075. Engineer's estimate, \$771.25.

Hyde Park, Mass.—Bids received for pipe sewers and drains, Harvest and Train Sts., Dorchester and Rutland Rd.: *George J. Regan, \$3,103.70. Other bids: M. De Sisto, \$3,309.25; Anthony Baruffaldi, \$3,546.95; Daddario & Booth, \$4,022.95; J. H. Ferguson, \$4,177.40. Engineer's estimate, \$5,728.35.

Roxbury, Mass.—Bids received for pipe sewers and drains, Tremont entrance Southeast Side: *Anthony Cofalo, \$6,332.40. Other bids: Anthony Baruffaldi, \$6,567.82; John F. McCarthy, \$6,815.40; Thomas Russo & Co., \$7,912.85; Vincenzo Grande, \$10,130.65. Engineer's estimate, \$7,364.70.

South Boston, Mass.—Bids received for pipe sewers and drains, E. 7th St., between G & H Sts.: *Vincenzo Grande, \$588. Other bids: M. H. Loonie, \$775.25; George J. Regan, \$960.75; Frank Drinkwater, \$2,575. Engineer's estimate, \$647.35.

Alinsworth, Neb.—Bids received for construction of vitrified sewer, 15,765 ft.

8-in., 4,860 ft. 10-in., 4,760 ft. 12-in., 1,110 ft. 18-in.: *A. Caniglia & Co., Omaha, \$16,294.60. Other bid: H. J. Petersen, Omaha, \$17,839.55.

Mt. Pleasant, N. Y.—*J. E. Harrigan, for construction of sewer, at \$20,448.65.

Charlotte, N. C.—*A. H. Gulon & Co., for laying sewer in East Eleventh St., between College St. and railroad, at \$156. Other bidders were: Blankenship & McClelland, \$172; D. B. Stearns & Son, \$171.

Urbana, O.—Bids have been received as follows: For construction of storm sewers between Scioto and East Church Sts. on East and West Court Sts., Walter and Locust Sts. and a sanitary sewer on Miami St., from Oakland St. to Edgewood Ave. The bidders were: Fair & Dwyer, Greenville; Charles F. Smith & Co., Dayton; Boyd & Cook, Dayton; Patrick Caffery, Springfield; Krumholtz & Hounker, Springfield; J. A. Swingle Contracting Co., Zanesville, and Harry Hegeler and Geyer & Grimes, local.

Williamsport, Pa.—*Joseph McCadden, for construction Packer St. sewer at approximately \$1,045.

Superior, Wis.—*Pastoret Construction Co., for construction of Itasca sewer at \$16,481.09. Other bids: Magnus Peterson, \$16,678.92; Riches & Sons, \$16,777.70, and Johnson Anderson, \$18,568.00.

WATER SUPPLY.

Los Angeles, Cal.—As result of a conference between members of City Council and Van Nuys Chamber of Commerce plans will be launched soon to create a storm protection district in San Fernando valley around Van Nuys, and within city, to vote \$482,000 for construction of ditches and conduits to care for storm water.

Nederland, Colo.—A bond issue of \$20,000 is under consideration which is to be used for the construction of water works.

Washington, D. C.—Ministry of Public Works of Uruguay will soon invite bids for installation of public water services in Maldonado and Rocha, plans and specifications have been drawn up by technical department.

Athens, Ga.—Waterworks bonds amounting to \$40,000 will be issued.

Waukegan, Ill.—City Commission has the installation of a combined pumping station and filtration plant, to cost approximately \$180,000, under consideration.

Waukegan, Ill.—City Council is considering the installation of a filtration plant.

La Porte, Ind.—Bids on water works reservoir will be opened at a special meeting of the board.

Louisville, Ky.—Fire hydrants have been set at the intersection of many streets.

Menominee, Mich.—Bids will be received June 29 on a 3,000,000 gallon filtration plant. Burns & McDonnell, consulting engineers.

Saginaw, Mich.—City Engineer has submitted plans and estimate of cost of 6-in. water mains in several streets, and work is to proceed with day labor.

Sault Ste. Marie, Mich.—The Board of Public Works has been authorized and directed to have hydrant located at corner of Meridian and Spruce Sts. removed and placed in front of Richards' ice house on Spruce St. west.

Meridian, Miss.—The installation of a new water main to cost approximately \$16,000, and additional filtering equipment, is under consideration. City engineer recommended the installation of the pipe line in interest of economy of operation and fire protection to the city.

Kansas City, Mo.—An ordinance has been passed providing for the issuance of \$100,000 Blue River Improvement bonds.

Billings, Mont.—An ordinance has been passed requiring that all service pipe connections with the city water mains be installed by the city water department and that lead pipe be used to the curbing. The new ordinance also makes it an offense for private concerns to do the work. An ordinance has been passed authorizing the water department to put in lead service connections on North 30th St. in district about to be paved.

Billings, Mont.—Council has voted to put in an 800-ft. extension of 6-in. water main on South 40th St.

Great Falls, Mont.—Bids will be received July 10 on a 12,000,000 gallon filtration plant. Burns & McDonnell, consulting engineers.

Winnebago, Neb.—Bonds amounting to \$10,000 will be issued for the construction of a water and light plant.

Perth Amboy, N. J.—Bonds amounting to \$100,000 will be issued for water improvements.

Perth Amboy, N. J.—Sealed proposals will be received until June 21 by J. A. Rhodes for \$100,000 water bonds.

Batavia, N. Y.—Five separate contracts have been awarded by the common council for the substructure and machinery for new water works plant, to be built in connection with the pure water system. The total of the contracts aggregate \$90,000. It is proposed to hold a special election soon to vote an extra appropriation in addition to the \$175,000 that has already been appropriated for the pure water system.

Herkimer, N. Y.—It is expected that taxpayers will soon be called upon to vote a large appropriation for a new water system.

Watertown, N. Y.—Four additional fire hydrants, 5 new gate valves and about 20 new meters are to be installed. One new pump, 5,000,000-gal. capacity, is to be added to the pumping plant.

Rocky Mount, N. C.—Approximately quarter of a mile of 8-in. water mains will be laid to give better fire protection.

Deshler, Ohio.—Bonds in the sum of \$22,000 have been voted for installation of a municipal electric light plant at Deshler. In addition to this improvement, bonds in the sum of \$33,000 have been approved for a water works system there.

Montpelier, Ohio.—850 ft. of 6-in. and 100 ft. of 4-in. c. i. water pipes is to be laid, 2 new fire hydrants and 2 new gate valves, and about 50 new meters will also be installed.

Tiffin, Ohio.—City Council has authorized the engineer to prepare plans and estimates for a Walnut St. drain.

Tiffin, Ohio.—City Council has authorized engineer to prepare plans and estimates for draining under the railroads on North Washington St. and for re-paving with brick on concrete of that street from the river bridge to Harrison St.

Tulsa, Okla.—The Mayor and City Commissioners have the water problem under further consideration. An understanding has been practically reached that as soon as possible there would be a vote on bonds for improvement of the system by installing an additional basin capacity of from six to ten million gallons, a modern filtration plant, and new mains connecting the plant with certain districts in city. The estimated cost of the improvements will total approximately \$65,000.

Baker, Ore.—Advertising for bids for hauling concrete pipe and other supplies to the line of city water system extension between Marble creek and Salmon creek, has been authorized.

Erie, Pa.—Improvements costing \$700,000 will be made on the water works. Among the plans recommended are: Construction of a 10,000,000-gallon reservoir on heights south of city; extension of high capacity water mains in all parts of city and abandonment of big Worthington pump at station, to make room for two pumps, one of which is to be used only for emergencies. The size of proposed reservoir will be 370 ft. long, 189 ft. wide and 20 ft. deep, with a flow line at elevation 333, or 5 ft. below top of the present standpipe.

Lebanon, Pa.—Water main on North Seventh St. from Guilford to Water Sts. will be extended before the street is paved.

Corpus Christi, Tex.—City Engineer Stevens has completed the plans for a settling basin to be constructed near the Calallen plant.

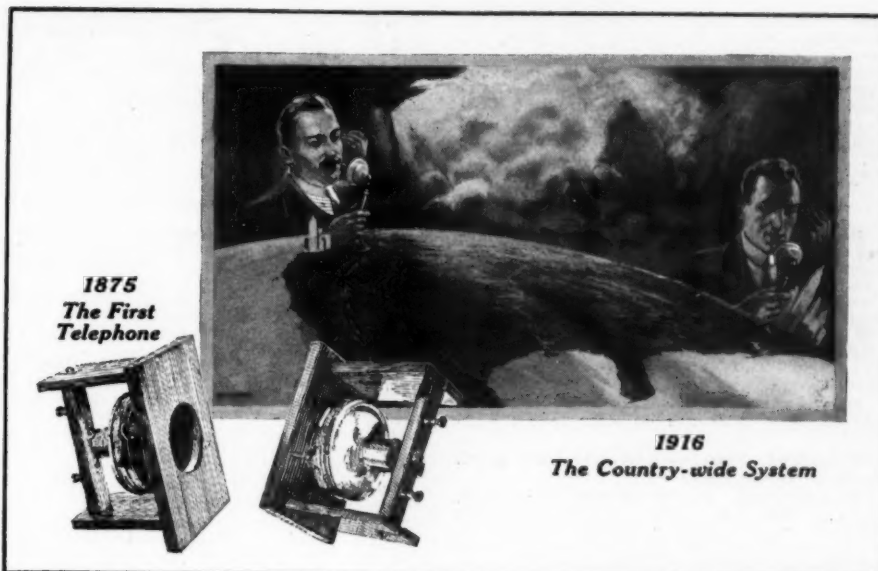
Kenedy, Tex.—Bonds will be issued amounting to \$26,000 for water works.

Ogden, Utah.—For \$250 the city has purchased the city water distribution system owned by W. J. Dallimore in Ogden City cemetery. Purchase was made on recommendation of Miles L. Jones, superintendent of the water works department, who thought city should own all distributive systems in cemetery since it is planning extensions there. Bids from Wheelwright Construction Co. and J. P. O'Neill Co. were received for paving Orchard Ave. with concrete between 24th and 25th Sts.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates contracts awarded.)

Sacramento, Cal.—*Telchert & Ambrose for the construction of Weir at \$326,000.



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With these things in mind, the Bell System looks forward with confidence to a future of greater opportunity and greater achievement.



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Waterbury, Conn.—*Antonio Lambo, for laying water mains in several streets.

Peekskill, N. Y.—Bids received for laying 6-in. water mains through Lelia St.: *John Smith, Jr., bid 31c. for 6-in. pipe; 23c. for 4-in.; \$1.50 for 6-in. valves; \$1.25 for 4-in. valve; \$1.90 for hydrant; 40c. for rock excavation. Other bid: D. D. Donovan bid 33c. for 6-in. pipe; 23c. for 4-in.; \$2.25 for 6-in. valves; \$2.15 for 4-in.; \$1.75 for hydrants and 33c. for rock excavation.

Florence, Ore.—*E. S. Dyer, for laying the water pipe for city system.

Galveston, Tex.—Bids on 3,400 ft. of cast-iron water pipe for laying of a main on Ave. H from 35th to 46th Sts. are as follows: United States Cast Iron Pipe & Foundry Co., \$30.50 per ton; R. D. Wood & Co., \$32; American Cast Iron Pipe Co., \$31.50 and \$30.50. Bids on such other

material for this work as lead and galvanized pipe, pig lead, etc., submitted as follows: Blum Hardware Co., \$1,639; Ben Blum & Co., \$1,524.34.

Norfolk, Va.—*W. P. Oberndorfer & Son for supplying water department with pipes. *R. O. Wood & Co., W. P. Oberndorfer & Son, local agents, for supplying water department with gate valves.

Everett, Wash.—Bids received on 28 miles of flow line, 2 river crossings, rock fill dam and other improvements as follows: for general construction, *Washington Paving Co., Seattle, Wash., \$158,937; other bidders, Sound Construction & Engineering Co., Seattle, \$164,300; Nettleton-Bruce Eschbach Co., Seattle, \$183,425; Booker, Keihl & Whipple, Seattle, \$192,430; Oregon Engineering & Construction Co., Oregon City, \$164,934; for furnishing and laying stove pipe, *Washington Paving Co., \$192,262; other bid-

ders: Pearson Construction Co., \$198,920; Nettleton-Bruce, Eschbach Co., \$194,650; Sound Construction & Engineering Co., \$197,630; Holt & Jeffery, \$205,000; for furnishing and laying steel pipe: *Washington Paving Co., \$121,943; other bidders, Pacific Coast Pipe Co., \$122,400; Pearson Construction Co., \$136,580; Booker, Keihl & Whipple, \$132,220.

MISCELLANEOUS.

Phoenix, Ariz.—For par, accrued interest and \$13,661 premium, state loan commission has sold \$300,000 worth of refunding bonds to Powell, Gerard & Co., of Chicago. There were seven bids. These bonds bear 4½ per cent. interest and run for 25 years, but state has the option of paying them off at end of 15 years. They are to refund bonds which bear 5 per cent. interest.

Bridgeport, Conn.—Bids have been received for extension of sea wall extension.

Stamford, Conn.—Bids on park work have been rejected.

Washington, D. C.—(Consular Dept. No. 21,469) A municipal corporation abroad is considering abandoning present cable line system, of street railway comprising 25 miles of track, and substituting an electric trolley system which will require new equipment and supplies of all kinds.

Washington, D. C.—(Consular Dept. No. 3352) Sealed proposals will be received by Light House Inspector, Boston, Mass., for furnishing and delivering two air compressing outfits. Further information obtained from Inspector.

Washington, D. C.—(Consular Dept. No. 21,493) A firm in the Orient requests descriptive literature and quotations for agricultural and mining machinery, including irrigation apparatus, and anti-mony smelting and washing machinery; also concrete mixing plants, sand and mud pumps, and dredgers for canal construction. Members of the firm contemplate a visit to the United States to inspect machinery most likely to meet their requirements.

Washington, D. C.—Citizen's associations in northeast are looking for a site for a new police precinct. The new precinct, if established, will cover a number of villages and thickly populated portions of the northeastern section.

Alton, Ill.—City contemplates the construction of an underground comfort station in City Hall Square, money for construction to be raised by subscription.

Alton, Ill.—Plans for new comfort station which will cost about \$3,000 are completed.

Huntington, Ind.—June 28, at 2 p. m., by auditor of Huntington county, for sale, \$40,000 hospital bonds, 4½ per cent., two and one-half years. Ovid E. Eviston, auditor.

Huntington, Ind.—June 10, 1916, at 10 a. m., by city clerk of Huntington, Ind., for sale of \$16,900 municipal bonds, 4½ per cent., 16½ years. H. I. Young, city clerk.

Richmond, Ind.—The clerk has been ordered to ask for bids for chassis to be used for a combination ambulance patrol for police and health departments.

Sullivan, Ind.—June 13, 1916, at 12 m., by city clerk, Sullivan, Ind., for sale of \$15,000 refunding bonds, 5 per cent., 10 years. J. M. Dudley, city clerk.

Lexington, Ky.—Bids for construction of sidewalks in front of Scovell park, on South Upper St., and completion of sidewalk system in Woodland park, will be advertised for soon. The Scovell park work will amount to 3,000 sq. yds. of work, while the Woodland park contract will amount to 6,000 square yards. The Scovell sidewalks will be four feet in width and the Woodland walks eight feet. The work to be done in Woodland park will be almost entirely in the northeast and eastern sections of the park.

New Orleans, La.—Hibernia Bank & Trust Co., New Orleans, has bought bond issue of \$125,000 for a county exhibit at the Mississippi Centennial Exposition in 1917.

Bay City, Mich.—Bonds amounting to \$47,000 are to be issued to be used for local improvements.

Pontiac, Mich.—The bid of A. J. Johnson on construction of cement retaining walls has been rejected. It is the only bid received.

Gulfport, Miss.—The Harrison County Board of Supervisors have opened bids for the construction of the new fireproof

courthouse to be built here to replace one destroyed by fire several months ago. Bids were posted on plans prepared by Architect N. W. Overstreet and ranged from \$100,000 to \$117,000, the lowest bidder being a Birmingham, Ala., firm.

Gulfport, Miss.—The board of supervisors has entered into a conditional contract with the firm of Dobbs & Wetmore of Meridian to erect new court house building at \$99,301. Contract is based on ability of board to issue bonds to cover cost.

Kansas City, Mo.—Several hundred dollars will be spent to renew part of the machinery of the municipal asphalt plant.

Webb City, Mo.—A new police patrol auto is to be purchased, the cost not to exceed \$1,500; motor cycle service is also contemplated.

New Brunswick, N. J.—Bids for jail and cells will be readvertised according to change in plans made by the architect.

New Brunswick, N. J.—Bonds amounting to \$150,000 for county jail and \$60,000 workhouse bonds have been sold.

Spring Lake, N. J.—Contractor Jesse Howland, of Seabright, has been authorized by Council to begin construction of a sixth beach front jetty near the casino. Because of alterations in the plans and specifications, which originally provided for 200-ft. jetties, the contract price was placed at \$9.40 a running foot, an increase of 40 cts.

Buffalo, N. Y.—Bids are to be opened for nearly \$1,300,000 bonds.

Troy, N. Y.—The mayor and department heads have decided to purchase another automobile street sprinkler and do away with horse drawn sprinklers.

Charlotte, N. C.—Elkin & Alleghany Railroad are going to issue additional bonds for \$60,000 for the purpose of extending the road 30 miles.

Coshocton, O.—The ordinance providing for the issuance of \$25,000 in bonds for building and equipment of an addition to city hospital has been passed.

Niles, O.—Sealed proposals will be received until July 17th for the purchase of village bonds amounting to \$344. Bonds amounting to \$5,000 are to be issued for paying part of cost of additional improvements in Union Cemetery.

Piqua, O.—Bids on city garbage contract all rejected and will readvertise.

Columbia, Tenn.—The purchase of a motorcycle for the use of the traffic policeman is under consideration.

Nashville, Tenn.—Commissioner of Finance Paul W. Trennor has been authorized to accept a proposal received from Goulding, Marr & Bro. for the sale to city of \$14,000 of bonds due and payable in 1918, the bonds being owned by the Fourth and First National Bank of Nashville.

Corpus Christi, Tex.—A special election will be held during week starting July 17 to determine whether or not a franchise for supplying natural gas to consumers in the city be granted.

El Paso, Tex.—Further bids are to be requested from contractors for the construction of comfort station, City Council has planned for San Jacinto plaza.

Tacoma, Wash.—The health board is making plans for the garbage collection. City is to be divided into districts and sanitary fills designated where garbage men may dump their wagons.

Milwaukee, Wis.—An ordinance providing for the issue of "Permanent Harbor Improvement Bonds" amounting to \$200,000 has been passed.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates contracts awarded.)

San Francisco, Cal.—*Blyth, Witter & Co., for \$500,000 5 per cent. issue.

Atlanta, Ga.—*Bird & Wilcox, local, for welding the gas mains.

Richmond, Ind.—Bids received for a street roller as follows: Studebaker Co., \$643; *Austin Western Co., Chicago, Ill., \$682.50.

Laporte, Ind.—*Fletcher-American National Bank of Indianapolis, bonds amounting to \$8,400, a premium of \$161.50. Other bidders: R. L. Dolling & Co., Indianapolis, \$8,545.15; Gavin L. Payne & Co., Indianapolis, \$8,546. Merchants' National Bank, Muncie, \$8,526.85; Fletcher-American National Bank, In-

dianapolis, \$8,561.50; Miller & Co., Indianapolis, \$8,491; Delaware County National Bank, Muncie, \$8,510.50; Breed, Elliot & Harrison, Indianapolis, \$8,540.

Holyoke, Mass.—Bids have been received for \$242,000 City of Holyoke bonds, as follows: Chandler-Wilbor & Co., Boston, 1,011.80; Merrill, Oldham & Co., Boston, 1,010.79; Harris, Forbes & Co., Boston, 1,007.60; Blake Bros. & Co., Boston, 1,005.93; R. L. Day & Co., Boston, 1,005.80; Cropley, McGaragle & Co., Boston, 1,005.73; Arthur Perry & Co., Boston, 1,005.60; E. H. Rollins & Sons, Boston, 1,005.58; Curtis & Sanger, Boston, 1,005.21; R. M. Grant & Co., Boston, 1,005.19; Estabrook & Co., Boston, 1,004.60; Blodgett & Co., Boston, 1,004.44; Adams & Co., Boston, 1,003.40.

Greenville, Miss.—Bids on levee as follows: Ben Lomand, new levee in Isaquena County, 240,000 cu. yds. *Roach & Stansell, of Memphis, at 17.70 cts. per cu. yd. Spur dike at Carters Neck, above Greenville and Vicksburg, for 29 cts. per cu. yd. Ten of the sub-levees, most of which are above Greenville, *Burt, Bonk & Murray, of Beulah, for prices ranging from 19 to 24.08 cts. per cu. yd. The remaining eleven sub-levees, all below Greenville, *John G. Sessions, of Memphis, as 17.20 cts. per cu. yd. on all.

Newport, Ky.—Bids for purchase of a steam roller to be used in improvement and repair of streets have been opened by Purchasing Agent William Hazelwood.

Saginaw, Mich.—Bids have been opened for building east side police station garage as follows: R. R. Forster, \$733; M. Schneider & Son, \$594.50; Robert W. Steele, \$580; R. C. Hendrick & Son, \$575; Burnett-Henige Construction Co., \$405; Wilson G. Kerns, \$490.

Atlantic City, N. J.—*M. B. Markland, local, for construction of two bulkheads at \$2,420. Other bidders, Dykes & Smith, \$2,450; J. W. Ingersoll, \$2,560; Edward L. Bader, \$3,274.

Elizabeth, N. J.—*Thomas Viscount for removal of garbage and ashes at \$69,975; contract is for 3 years from July 15th.

Hillsdale, N. J.—*Pennsylvania & Delaware Oil Co., for 6,000 gallons of oil at 7 cts. per gallon. Other bidders: Logan & Hathaway Co., 7 4-10 cts. per gallon; Standard Oil Co., at 7½ cts. per gallon.

New Brunswick, N. J.—Bids for the construction of the new \$150,000 county jail have been received by the Board of Freeholders of Middlesex County, the bids received being for the erection of the building and installation of the 80 cells. Bids are yet to be received for the heating, electric work and furnishing of the building. The bids were higher than expected with result that board will have to make some changes in the plans so as to bring the total cost within the \$150,000. The cells may have to be reduced to forty. The bids for construction of building were as follows: Hughes Foulkrod Co., Philadelphia, \$90,780; Lewis Board, this city, \$92,938; John Lowry, Jr., New York City, \$99,507; Geo. B. Rule, \$92,000; Frank J. Flegenbauer Co., Brooklyn, \$90,312; Dolan & Gorman, Sayreville, \$106,580.50; Marcell Wright, South River, \$104,685; Perrine, Bucklew Co., Jamesburg, \$97,120. The bids for cell work was as follows: Pauley Jail Building Co., New York City, \$56,394; Van Doren Iron Works, Cleveland, \$60,514; Stewart Iron Works Co., Cincinnati, \$57,790. All these bids were referred to the county buildings committee.

Galveston, Tex.—*A. P. Smith Mfg. Co., to furnish a \$900 valve-inserting machine for the water works department. *The Lawrence Electric Co., for \$1,458.99, to provide equipment for ornamental electric lighting system for Menard Park.

Parkersburg, W. Va.—The following bids for collection of garbage have been received: Ben Teter—First ward, \$749; second ward, \$800; fourth ward, \$519; fifth ward, \$529. Wm. Buckhannon—First ward, \$650; second ward, \$925; third ward, \$900; fourth ward, \$625; fifth ward, \$575; sixth ward, \$350; seventh ward, \$400; eighth ward, \$350. C. M. Ellis—First ward, \$700 second ward, \$850; third ward, \$795; fourth ward, \$525; fifth ward, \$550; seventh ward, \$350; eighth ward, \$325. J. O. Helney—First ward, \$725; second ward, \$925; third ward, \$975; fourth ward, \$550; fifth ward, \$600; sixth ward, \$330; seventh ward, \$375; eighth ward, \$350. J. W. Curry—First ward, \$600; second ward, \$799; third ward, \$1,200; fourth ward, \$550; fifth ward, \$559; sixth ward, \$300; seventh ward, \$330.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS.				
Wis.	Superior.....	1.30 p.m., June 26..	Grading three streets and alleys.....	Board of Public Works.
Pa.	Wilkes Barre.....	noon, June 26..	Improving several streets in Larksville Borough.....	Stoneham & Butts, Engineers, Miners Bank Bldg.
Cal.	Sacramento.....	11 a.m., June 27..	Improving streets by draining, curbing and paving with asphaltic concrete.....	M. J. Desmond, City Clerk.
N. Y.	Endicott.....	8 p.m., June 27..	Constructing brick, concrete and bitulithic pavements.....	Village Engineer.
Ill.	Springfield.....	11 a.m., June 28..	3,550 ft. state road, cost \$13,241.....	W. W. Marr, State H'way Eng.
N. J.	Elizabeth.....	2 p.m., June 29..	900 sy. yds. bluestone sidewalk.....	W. P. Neafsey, Street Com'r.
N. Y.	New York.....	2 p.m., June 30..	6,800 yds. sheet asphalt, 2,800 sq. yds. wood block, 6,200 cu. yds. concrete and 36,000 sq. yds. granite block; concrete sidewalks.....	Com'r of Public Works.
N. Y.	New Brighton.....	noon, June 30..	2,380 cu. yds. of broken stone and 680 cu. yds. of screenings.....	H. P. Morrison, Acting Boro President.
Idaho	Boise City.....	3 p.m., June 30..	46,025 sq. yds. first class pavement, gutters, etc.....	Nancy Robertson, City Clerk.
Ill.	DeKalb.....	10 a.m., July 3..	3,000 yds. concrete and 14,000 yds. brick pavement, concrete curb and gutter.....	A. R. Russell, City Engineer.
Ind.	North Vernon.....	7.30 p.m., July 3..	Paving 16,300 yds. with brick.....	C. W. Miles, City Engineer.
Ind.	Vincennes.....	2 p.m., July 5..	Constructing one mile of gravel road.....	J. Muentzer, County Auditor.
Ind.	Delphi.....	noon, July 5..	Constructing gravel or macadam roads.....	H. D. Good, Co. Aud.
Ind.	Mt. Vernon.....	2 p.m., July 7..	14,000 ft. gravel road.....	J. R. Haines, Co. Aud.
Ind.	South Bend.....	10 a.m., July 11..	Gravel pavement, grading, curbs and walks.....	Veronica Sweeney, Clerk, Bd. P. W.
N. Y.	Albany.....	1 p.m., July 16..	8.13 miles state road in Otsego county.....	Edwin Duffey, St. Hwy. Com.
WATER SUPPLY.				
Ill.	Springfield.....	June 27..	750 k.v.a. generator for pumping station.....	City Clerk
Minn.	McKinley.....	June 29..	75,000 gallons steel tank on 125 ft. tower.....	City Clerk
Miss.	Clarksdale.....	July 3..	22,500-gal. per. min. centrifugal pump, boiler and 400 ft. 36-in. pipe (steel).....	T. H. Allen, Engineer, Memphis, Tenn.
Mont.	Great Falls.....	July 10..	12,000,000-gal. filtration plant.....	Burns and McDonnell, Engineers, Kansas City, Mo.
MISCELLANEOUS.				
Pa.	Harrisburg.....	10 am., June 28..	Furnishing motor license number plates.....	State Highway Commission.
D. C.	Washington.....	June 30..	Furnishing repair trucks.....	Chief Signal Officer, War Dept.
Tex.	Fort Worth.....	10 a.m., July 3..	Levee construction.....	District Engineer.

STREETS AND ROADS

Miami, Fla.—All bids have been rejected on 54,000 sq. yds. asphaltic concrete pavement and new bids will be received on July 6. B. H. Klyce, City Engineer.

Bloomington, Ind.—Bids will be received June 27 for the paving of North College Ave. from 7th to 14th St. Bids will also be received for the improvement of Sluss Ave. and University St.

Bluffton, Ind.—Market, Main, Johnson and Washington Sts. will be improved with brick pavements.

Boonville, Ind.—July 3, 1916, at 10 a. m., by Treasurer of Warrick County, for sale \$2,600 highway improvement bonds, 4½ per cent, ten years. Wm. H. Putler, Treasurer.

Brazil, Ind.—June 29, 1916, at 10:30 a. m., by Treasurer of Clay County, for sale \$9,200 and \$13,400 highway improvement bonds, 4½ per cent, ten years. Thomas W. Swinehart, Treasurer.

Columbus, Ind.—June 27, 1916, at 2 p.

m., by Treasurer of Bartholomew County, for sale \$48,500, \$40,000, \$44,000 and \$7,000 high improvement bonds, 4½ per cent, ten years. Ed. Surverkrup, Treasurer.

Indianapolis, Ind.—June 24, 1916, at 10 a. m., by Treasurer of Marion County, for sale \$44,000 highway improvement bonds, 4½ per cent, ten years. Ed. G. Sourbier, Treasurer.

Kokomo, Ind.—Main St. from Taylor St. to Wildcat Creek will be resurfaced.

Logansport, Ind.—Cement sidewalks are to be constructed on several streets.

Muncie, Ind.—Engineer's figures have been approved on following improvements: Ohmer Ave. sidewalk from Walnut to Liberty Sts., \$1,389.42; Mulberry St. sidewalk from Ohmer Ave. to 15th St., \$1,136.40; Ohio Ave. sidewalks from Windsor to Brotherton Sts., \$390; 13th St. sidewalk, south side from Hoyt Ave. to Port Ave., \$744.64; Myrtle Ave. sidewalk from Jefferson to Madison Sts., \$1,150; alley between Franklin and Liberty Sts. from Charles to Howard Sts., \$970;

sewer in alley between First and Powers Sts. from Pierce to Elliott Sts., \$999.39.

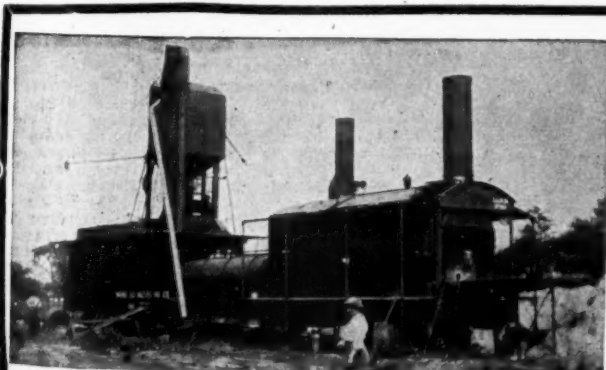
New Albany, Ind.—June 24, 1916, at 10 a. m., by Treasurer of Floyd County, for sale \$12,800 highway improvement bonds, 4½ per cent. Claude A. Sittason, Treasurer.

Noblesville, Ind.—June 24, 1916, at 11 a. m., by Treasurer of Hamilton County, for sale \$8,380, \$3,220, \$2,920, \$9,000, \$3,320, \$2,760, \$3,400, \$3,500 and \$2,740 highway improvement bonds, 4½ per cent, ten years. L. G. Heiny, Treasurer.

Portland, Ind.—The city will purchase 1,000 tons of crushed stone for the improvement of streets. The city clerk has been instructed to get prices on stone from stone companies.

Warsaw, Ind.—June 30, 1916, at 2 p. m., by Treasurer of Kosciusko County, for sale \$39,450 highway improvement bonds, 4½ per cent, ten years. A. J. Logan, Treasurer.

Ocala, Fla.—New concrete sidewalks are to be laid in southeast section of town.



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Lawrence, Kan.—Merchants will back plan to build concrete highways.

Louisville, Ky.—Ordinances have been passed to improve sidewalks on many streets.

Monroe, La.—Road bonds sold as follows: Commercial National Bank, Shreveport, \$100,000; Bank of Commerce, local, \$100,000; Peoples Bank, local, \$50,000.

Pittsfield, Mass.—\$96,000 has been appropriated to pave South St. from Bank row to South Mountain road.

Hannibal, Mo.—Ordinances for paving several streets have been passed.

Joplin, Mo.—Seventh St. will be paved from Joplin St. to first alley west of May St. with 4-in. vertical fiber brick. The city engineer has been ordered to prepare estimates on cost of constructing concrete curb and gutter on Gray St. from Fourth to Seventh St., on Jackson Ave. from 10th to 13th St., and on 18th St. from Anna Baxter to first alley east of Grand Ave., where curb and gutter are not already in. An estimate of cost of paving alley between Joplin and Wall St. from 14th to 20th St. has also been ordered.

Grand Island, Neb.—Council has accepted specifications for new paving districts.

Camden, N. J.—An ordinance directing the paving of several streets has been passed.

Rahway, N. J.—Steps have been taken to pave West Grand St. from St. George Ave. to Irving St. with a permanent pavement.

Buffalo, N. Y.—Lower Main St. is to be improved by paving.

Eaton, O.—Bids are to be received by City Council on street paving contract estimated approximately \$80,000 and an \$18,000 bond issue.

Salem, O.—Road between Lisbon and Salem will be paved, 6 miles, 4,187 ft.; bonds amounting to \$105,000 to cover cost of construction will be sold July 10. Bonds amounting to \$30,000 for the improvement of Lincoln Highway will also be sold.

Springfield, O.—Bonds amounting to \$5,000 for street improvements are to be issued.

Tiffin, O.—It has been found necessary to improve St. Clair St. from Market St. south 750 feet by paving with vitrified brick or other suitable material upon a stone or concrete foundation.

Johnstown, Pa.—The following ordinances have been passed: Providing for the extension of Pike alley in the Walnut Grove section of the 17th Ward from Billie alley to May Ave.; vacating that part of Billie alley between Bedford St. and Pike alley; providing for grading and paving Hahn alley in the Sixth Ward; appropriating sufficient funds to erect a concrete retaining wall at Ash and Bedford Sts. in the Seventh Ward.

Cumberland, R. I.—A special appropriation of \$5,000 for the rebuilding of the Sneechaconnet road has been made.

El Paso, Tex.—The petition for a road for the north loop back along Juan Herrera ditch has been granted; also rebuilding of about 2,000 ft. of fence along road between the Stevens and Orndorff land.

Superior, Wis.—Harrison St. from Hammond to Weeks Ave. is to be paved.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates contracts awarded).

Wilmington, Del.—Union Paving Co., Schenectady, N. Y., for laying 120,000 yds. of asphalt pavement at more than \$200,000.

Indianapolis, Ind.—Campbell & Hawkins, Brazil, for road work at \$7,978, and Charles A. Rhodes, Cary, for road work, \$12,132; John Fridy, Evansville, for rock road, Center Township, \$4,627.

Kokomo, Ind.—Bids received for reinforced concrete sheet asphalt pavement as follows: J. H. Watson Co., local, Wabash St., at \$5,794; Kokomo Asphalt Paving Co., Indiana St., at \$4,625.

Peru, Ind.—Charles Wilburn for oiling streets at \$6.15 per 100 gallons.

South Bend, Ind.—Bids have been ordered for a curb on Donald St. from Michigan to Main St. Bids received: Pipe sewer on High and Haney, Staples & Ackerman, for \$6,884.50; Mariette St. pipe sewer, for \$380; the pipe sewer on Liston St., for sewer on Eddy and Mishawaka between Jefferson and 19th St., DePape Cousin, \$1,313.40.

Tell City, Ind.—Cornelius Paulin Co., for 2 miles link rock roads in Tobin Township, at \$10,722.80.

Winamac, Ind.—Bids received for paving 32,350 sq. yds. as follows: Palmer Moore & Co., Logansport, \$48,919.22; A. F. Cohee & Co., Frankfort, \$48,922.63; Nejdil & Greenwald, Whiting, \$49,250.68.

Lawrence, Kan.—A. R. Young & Co., for paving Louisiana St. from 16th to 18th St., at 52 cts. for excavation, 48 cts. for curbing and guttering, and \$2.17 for paving; Glibben & Hobbs, for paving 16th St., at 42 cts. for excavation, 43½ cts. for curbing and guttering, and \$1.06 for concrete paving; J. E. Edwards, for paving alley west of Louisiana St., at 50 cts. for excavation, and \$1.05 for concrete paving.

Louisville, Ky.—Alex Staepeler, for 4.7 miles road, 12 ft. wide, macadam resurfacing, at \$1.49 cu. yd. Other bidders were Chas. Ochsner, Jr., \$1.65; Edgar Cox and William Cox, \$2.13; W. E. McKenzie, \$2.10.

Louisville, Ky.—Louisville Asphalt Co. for reconstruction of a section of Preston St. road at \$9.911, using lake asphalt.

Escanaba, Mich.—Delta Contracting Co. and Bichler Bros., for macadamizing 10 miles of highway at approximately \$100,000. Larson & Colburn for grading highway from Beaver north to Marquette County line.

Hannibal, Mo.—George Comery for paving and curbing Bird St., curbing 35 cts. per lin. ft., and \$1.25 per sq. yd. for paving; F. C. Exter for paving alley through block 25 at \$1.22½ per sq. yd.

Milburn, N. J.—Bids received by Township committee for two 6-in. macadam paving jobs, Osborne & Marsellis Co., Upper Montclair, N. J., at \$18,165 and \$5,064.

Dunkirk, N. Y.—John A. McCormack & Son, Erie, Pa., for improvement of McKinley Ave.

Norwich, N. Y.—Frank A. Bushley for paving at \$7,688.75.

Tacoma, Wash.—Bids received for paving 34,813 sq. yds. 2-in. Warrenite pavement, as follows: Washington Paving Co., Tacoma, at \$37,843.

SEWERAGE

Knox, Ind.—June 30, 1916, at 2 p. m., by Treasurer of Starke County, for sale \$1,698.66 and \$2,940.22 ditch bonds, 5 per cent. ten years. Henry Luken, Treasurer.

Kokomo, Ind.—A 10-in. vitrified sewer is to be constructed in Park Ave. between Williams and Lindsay Sts.

Peru, Ind.—Plans and specifications, together with estimated cost of proposed lateral sewer between Second and Third Sts. from Lincoln to Smith Sts., have been approved.

Peru, Ind.—Bids will be received June 27th for construction of a lateral sewer in Euclid Ave. from Wayne to Benton St., and between Ninth and Tenth Sts. from Fremont to Grant St.

South Bend, Ind.—Improvements are to be made on several streets by the installing of sewers.

Pittsfield, Mass.—\$9,500 has been appropriated for Parkside Ave. sewer.

Fremont, Neb.—City Council has sewer problem under consideration.

East Rahway, N. J.—Sewers are to be constructed in the following streets at a cost of approximately \$3,000: Essex, Lawrence, Lafayette, Montgomery, and Washington Sts.

Buffalo, N. Y.—The village of Sloan has offered to pay \$18,000 for the privilege of connecting its sewer with the city sewer system.

Springfield, O.—\$2,000 worth of bonds are to be issued for a storm water sewer.

Springfield, O.—Estimates on the cost of complete sewer system are placed as approximately \$31,000.

Westerly, R. I.—Westerly is to have a sewer system, cost of construction will be over \$200,000.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates contracts awarded).

Lawrence, Kan.—C. C. Coleman, for construction of sewer west of New Hampshire St., between 14th and 15th Sts., at \$345.65. Fred Fein for constructing sewer for blocks 5, 6 and 15, University place, at \$948.20.

Omaha, Neb.—J. J. Hanighen Co., to build a storm water sewer through Min-

ne Lusa addition, Redick Ave. to Mary St., at \$57,000. This will be an extension of Miller Park sewer and will be 12 ft. in diameter at its widest point.

WATER SUPPLY

Washington, D. C.—(Consular Dept. No. 21538).—A firm in Netherlands wishes to represent American manufacturers of gas burners, gas and water main fittings, fittings for sanitary purposes, metal store fixtures, etc.

West Monroe, La.—Bonds amounting to \$45,000 will be issued for a filtering plant, doubling the capacity of the light and water plants, and the purchase of an auto hose truck.

Springfield, O.—Bonds amounting to \$10,000 will be issued for the municipal water works plant in addition to the \$30,000 issue voted last April.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates contracts awarded).

Sheboygan, Wis.—The total cost of installing proposed new water works system for city of Sheboygan Falls will be \$30,572.56. Separate contracts as follows: Laying cast iron pipe, 1,655 ft., E. M. Scheffow, of Elgin, Ill., \$7,963.95; erection of water tower, Chicago Bridge & Iron Co., \$4,140; furnishing 16,555 ft. of cast iron pipe, James B. Clow & Sons Co., of Chicago, \$12,419.61; hydrants and valves, Ludlow Valve Co., of Minneapolis, \$1,500; pumping outfit, Keystone Drilling Co., of Chicago, \$2,060; rock excavation work for mains crossing the river in two places, E. M. Scheffow, \$463; drilling wells, Kispert & McCarthy Co., of Chicago, \$2,021. The steel tank will be 60 ft. high with a capacity of 80,000 gallons. The pumping station will be erected in the rear of fire station.

LIGHTING AND POWER

Oscalooosa, Ia.—Installing new street lights is under consideration.

West Monroe, La.—See "Water Supply."

Saginaw, Mich.—A large number of bids have been opened, there being four different sets of proposals, chief of which were for ornamental lamps. The Consumers' Power Co. bid on 12 such lamps for the Genesee Ave. bridge at \$696 and six on Lake Linton bridge for \$348, and also for 24 lamps on Court St. between the river and Washington Ave. at \$52.50 the lamp.

Nashua, N. H.—The lighting system is to be improved by the installation of some new lights and the termination of the old contract and execution of a new contract.

Elizabeth, N. J.—Gas Light Co. will install a number of new street lamps.

Kernersville, N. C.—Bonds amounting to \$10,000 will be issued for the purpose of installing electric lights.

Massillon, O.—Light plans and specification drawn by H. O. Swoboda, Pittsburgh, have been approved by City Council.

Milwaukee, Wis.—The city is to build a municipal light system.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates contracts awarded).

San Francisco, Cal.—Only one bid has been received for supplying city with gas and electricity, that was from the Pacific Gas & Electric Co.; there will be some changes in prices from last year.

Springfield, O.—Gray Electric Co. for furnishing and installing the globes and sockets for the cluster lighting system.

Harrisburg, Pa.—Light contract awarded: Beacon Light Co., for lighting streets of Rigley Park; the Suburban Gas Co., for lighting; Smith & Co., for oiling streets of the borough.

FIRE EQUIPMENT

Kokomo, Ind.—July 8, 1916, at 10 a. m., by City Clerk, for sale, \$9,000 fire department bonds, 4½ per cent., ten years. Ben Havens, City Clerk.

New Orleans, La.—Five hundred feet of hose has been ordered and the purchase of a hose carriage and truck is under consideration.

Pekin, Ill.—The new fire truck, police patrol and ambulance have been accepted by the City Council.

West Monroe, La.—See Water Supply.

Salem, Mass.—The Rebuilding Commission has endorsed proposition for a fire station on Loring Ave. and will ask for an appropriation of \$15,000 to carry out project.

Springfield, Mass.—The Florence steamer must have a new boiler, cost \$1,275. The money has been appropriated.

Saginaw, Mich.—Mayor Paddock recommended the purchase of a triple combination auto fire apparatus, made by the Seagrave Co., Columbus, O., at \$8,122.50.

Asbury Park, N. J.—A special election will be held next month to vote on motorization of fire department of District No. 1. It is planned to buy a pumping engine and motor truck, a combination hose truck and a chemical.

Rocky Mount, N. C.—A \$9,000 triple combination chemical pump and hose, auto fire truck has been purchased.

Lewistown, Pa.—A new combination chemical hose wagon, six cylinder motor type, is to be purchased. It will have a capacity of 1,000 feet 2½-in. water hose, and a 40-gallon chemical tank, 200 feet ¾-in. chemical hose; also an extension ladder equipment.

BIDS RECEIVED AND CONTRACTS AWARDED.

(*Indicates contracts awarded.)

Spring Lake, N. J.—Bids for \$8,000 worth of bonds for purchase of new Goodwill fire engine will be received June 26. The bonds are for 20 years at 5 per cent., with accrued interest, dated Sept. 1, 1915.

Port Jervis, N. Y.—*E. T. Courvorsier for new Federal automobile fire truck.

Tippecanoe, O.—*Hallock Engineering Co., for the new motor fire truck with trailer at \$1,500.

Williamsport, Pa.—Bids for fire apparatus received as follows: La France-American Fire Engine Co., Elmira, for 800-gallon pump, \$9,250. They also bid \$1,500 for old engine at No. 1 Engine house; 1,000-gallon capacity pump, \$9,500. The Seagrave Co., Columbus, O., \$10,000 for a 1,000-gallon capacity pump and also \$1,500 for engine. For 800-gallon capacity pump, \$9,500. The James A. Boyd & Bro. Co., Philadelphia, \$8,210 on a 1,000-gallon pump, which included a 6 per cent. discount should the bid be awarded to them and also \$250 for old engine. They did not bid on an 800-gallon capacity pump.

BRIDGES

Los Angeles, Cal.—Preparations are about complete for building of new \$20,000 bridge across Los Angeles River for pleasure and auto truck use connecting Glendale with Lake Shore drive just beyond Edendale. The boulevard course has been surveyed and engineers are at work on detailed plans. The boulevard will leave Lake Shore just before reaching the turn of the Pacific Electric line and cut through on Ivanhoe Ave. to Los Angeles River, where a substantial bridge will be constructed to parallel scenic bridge of electric railway company, boulevard also to run alongside the railway to Brand Blvd. New boulevard will shorten auto route to Los Angeles from Glendale a distance of about 3 miles.

Orland, Cal.—Two new concrete bridges are to be built across Hambright Creek to Orland.

Peru, Ind.—July 29, 1916, at 10 a. m. by auditor of Miami county, for sale, \$20,000 bridge bonds, 4 per cent., 20 years. Frank K. McElheny, Auditor.

Richmond, Ind.—Estimate cost of construction of Main St. and South G St. bridges over the Whitewater is \$200,000.

Pascagoula, Miss.—A site has been selected for bridge across West Pascagoula River. Bridge will be located 375 ft. north of L. & N. right-of-way. The road to be built across marsh will be 32 ft. at the base with a 20-ft. crown. Fifty thousand dollars worth of county bonds have been ordered sold for building bridge and \$40,000 of Supervisors districts three and four for purpose of building a road from Alabama state line to Harrison County line.

Elizabeth, N. J.—The committee on bridges has recommended the construction of several small bridges.

Buffalo, N. Y.—A special meeting will be held July 6 to vote on five proposi-

tions for raising money for building bridges and culverts and repairs. A total of \$22,100 is needed.

Spokane, Wash.—Bids on \$265,000 worth of bridges will be advertised soon.

BIDS RECEIVED AND CONTRACTS AWARDED.

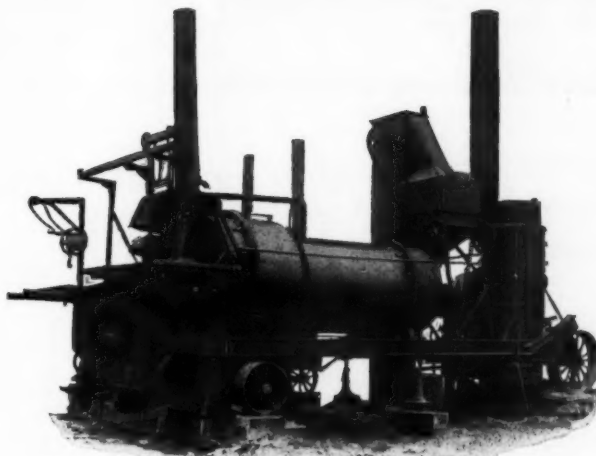
(*Indicates Contracts Awarded.)

Mobile, Ala.—*Hancock, Harbin & Hancock, for the construction of a creosoted lumber bridge over Three-Mile creek on the Conception St. road was awarded today by the Board of Revenue and Road Commissioners at \$3,093. Other bidders were: Lyons Hunter, \$3,990; Jeff Muths' Construction Company, \$3,166; J. T. Jett and Company, \$3,296.42. The bridge will be 271 ft. in length with an 18-ft. roadway. Work will be under direction of County Highway Engineer Harry Fisher.

Douglas, Ariz.—*Seagrave Co., for motor fire truck.

Yazoo City, Miss.—*W. J. Young Bridge Co., for construction of bridge over Big Black river at Scotts ferry at \$8,950.

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MISCELLANEOUS.

Washington, D. C.—An engineer and importer in Australia wishes to enter into commercial relations with manufacturers of pneumatic tools and all kinds of stone working machinery and tools, all kinds of tools used in connection with boiler, tank and bridge work. Catalogues and full particulars desired.

Washington, D. C.—(Consular Dept. No. 21533). The head of a government chemical laboratory in Latin America wishes to receive catalogues from publishing houses with view to purchasing additional books for chemical and industrial library of institution.

Jacksonville, Fla.—Docks will be constructed in the downtown section.

Kokomo, Ind.—Bonds amounting to \$9,000 will be sold July 8 to the highest bidder.

Cleveland, Ohio.—Sealed bids will be received until July 17 for the purchase of city bonds amounting to \$121,000.

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Plant: Niagara Falls, N. Y.

OFFICE OF THE STATE COMMISSION OF HIGHWAYS

ALBANY, N. Y.

Sealed proposals will be received by the undersigned at their office, No. 55 Lancaster Street, Albany, N. Y., at 1 o'clock P. M., on Monday, the 10th day of July, 1916, for the construction of highways in the following counties:

Albany (two highways—0.17 and 0.88).
Cattaraugus (approx. 4.73).
Cayuga (approx. 4.39).
Chautauqua (approx. 4.33).
Chemung (approx. 4.14).
Chenango (approx. 7.09).
Clinton (approx. 10.46).
Dutchess (approx. 0.56).
Essex (approx. 1.76).
Fulton (approx. 5.13).
Greene (approx. 2.39).
Herkimer (approx. 5.10).
Madison (approx. 6.54).
Monroe (approx. 2.92).
Nassau (approx. 5.24).
Oneida (approx. 6.15).
Otsego (approx. 8.13).
Saratoga (approx. 6.10).
Wayne (approx. 3.67).
Westchester (approx. 1.74).

ALSO FOR THE REPAIR OF THE FOLLOWING:

Erie (one contract—surface treatment).
Fulton (one contract—resurfacing).
Nassau (one contract—resurfacing).
St. Lawrence (one contract—resurfacing).
Ulster (one contract—resurfacing).
Sealed proposals will also be received at 1 o'clock P. M., on Wednesday, the 12th day of July, 1916, for the construction of the following highways:
Albany (two highways—3.23 and 5.62).
Cattaraugus (approx. 2.17).
Cayuga (approx. 3.89).
Chautauqua (approx. 0.74).
Chenango (approx. 2.91).
Essex (approx. 4.95).
Fulton (two highways—2.90 and 1.10).
Genesee (approx. 7.60).
Madison (approx. 5.65).
Monroe (approx. 7.93).
Nassau (approx. 3.09).
Oneida (approx. 5.74).
Oswego (approx. 0.36).
St. Lawrence (two highways—0.44 and 4.60).
Steuben (approx. 5.76).
Wayne (two highways—3.97 and 2.25).

ALSO FOR THE REPAIR OF THE FOLLOWING:

Dutchess (one contract—resurfacing).
Erie (one contract—resurfacing).
Monroe (one contract—resurfacing).
Niagara (one contract—resurfacing).
Westchester (one contract—resurfacing).
Sealed proposals will also be received at 1 o'clock P. M., on Friday, the 14th day of July, 1916, for the construction of the following highways:
Albany (approx. 2.93).
Chautauqua (two highways—5.65 and 3.90).
Chenango (approx. 0.82).
Fulton (two highways—2.80 and 3.74).
Genesee (approx. 7.94).
Herkimer (approx. 5.67).
Madison (approx. 0.91).
Monroe (two highways—3.69 and 5.27).
Nassau (approx. 3.38).
Niagara (approx. 2.38).
Onondaga (approx. 5.55).
Oswego (approx. 2.04).
Otsego (approx. 7.87).
St. Lawrence (approx. 11.16).
Ulster (approx. 2.73).
Wayne (two highways—1.88 and 6.41).
Westchester (approx. 2.74).

ALSO FOR THE REPAIR OF THE FOLLOWING:

Cattaraugus (one contract—resurfacing and surface treatment).
Delaware (one contract—surface treatment).
Erie (one contract—resurfacing).
Nassau (one contract—resurfacing).

Maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of the Division Engineers in whose division the roads are to be improved. The addresses of the division engineers and the counties in which they are in charge will be furnished on request.

The especial attention of bidders is called to "GENERAL INFORMATION OF BIDDERS" on the itemized proposal, specifications and contract agreement.

EDWIN DUFFEY,
Commissioner.

I. J. MORRIS,
Secretary.

NOTICE TO CONTRACTORS

Bids will be received by the City of Harrisburg, Va., for constructing vitrified Block and Asphalt Block pavement until noon, July 5, 1916. Approximate quantity 18,000 square yards.

Specifications and blank forms from City Clerk. City reserves right to reject any or all bids.

E. A. ZIGLER,
Chairman Street Committee.

TREASURY DEPARTMENT, Supervising Architect's Office, Washington, D. C., June 20, 1916.—Sealed proposals will be opened in this office at 3 p. m., August 2, 1916, for the construction complete (including equipment) of three interior safety vaults, of reinforced concrete, in the United States customhouse, New Orleans, La. Drawings and specifications may be obtained from the superintendent of construction at the customhouse, New Orleans, La., or at this office, in the discretion of the Supervising Architect. Jas. A. Wetmore, Acting Supervising Architect.

NOTICE TO BIDDERS

The city of De Kalb, Illinois, will receive bids until 10 o'clock A. M., Monday, July 3rd, 1916, for 14,000 yards of brick and 3,000 yards of concrete pavement with concrete curb and gutter.

The right is reserved to reject any or all bids. For specifications address A. R. Russell, City Engineer, De Kalb, Illinois.

City of Bradford, Pa., Engineer B. A. Wise will send specifications on approximately 8,000 sq. yards brick paving, 7,000 lin. ft. curb. \$1,000 certified check, bids close 5 P. M., July 3rd.

E. C. CHARLTON,
City Clerk.

Proposal Advertising

Municipal officials will serve their constituents well by seeing that PROPOSALS FOR MUNICIPAL IMPROVEMENTS of all kinds are inserted in

Municipal Journal

Publication Office:
50 Union Square, New York

OFFICE OF THE STATE COMMISSION OF HIGHWAYS.

ALBANY, N. Y.

Sealed proposals will be received by the undersigned at their office, No. 55 Lancaster Street, Albany, N. Y., at 1 o'clock P. M., on Monday, the 26th day of June, 1916, for the construction of highways in the following counties:

Hamilton (one highway—approx. 4.22 mi.); Otsego (one highway—approx. 12.66 mi.); Wyoming (one highway—approx. 3.52 mi.).

Also for the repair of the following:

Albany (two contracts—concrete pavement and resurfacing); Cayuga (two contracts—resurfacing); Cortland (two contracts—resurfacing); Delaware (one contract—resurfacing); Essex (one contract—surface treatment); Herkimer (one contract—resurfacing); Livingston (one contract—resurfacing); Montgomery (two contracts—resurfacing and surface treatment); Niagara (one contract—resurfacing); Oneida (one contract—resurfacing); Onondaga (six contracts—resurfacing and surface treatment); Rensselaer (two contracts—resurfacing); Sullivan (one contract—resurfacing); Westchester (one contract—surface treatment);

and also for the furnishing and delivering of broken stone for maintenance work on Road No. 756 and 5187, known as Broken Stone Contract No. 70, Essex County.

Maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of the Division Engineers in whose division the roads are to be improved. The addresses of the division engineers and the counties in which they are in charge will be furnished on request.

The especial attention of bidders is called to "GENERAL INFORMATION FOR BIDDERS" in the itemized proposal specifications and contract agreement.

EDWIN DUFFEY,
Commissioner.

I. J. MORRIS,
Secretary.

BIDS WANTED

Painting Dome of Court House, Hackensack, N. J. Apply to Custodian for specifications.

JAS. M. HARKNESS,
Clerk, Board of Freeholders.

DANVILLE, KENTUCKY ASPHALT PAVING

Sealed proposals will be received by the Board of Council of the City of Danville, Ky., until July 4th, 1916, at 7.30 P. M., and then opened, for about 7000 square yards of Asphalt Paving on Main Street, in accordance with the Plans and Specifications prepared by S. F. Crecelius, Engineer, copies of which may be had at the office of the Superintendent of Streets, Danville, Kentucky, or mailed to bidders, on payment of \$2.00.

Proposals will be for paving with Sheet Asphalt and Alternate proposal for Bituminous Concrete, and will include curbs, guttering, storm-water sewers, catch basins, etc.

J. M. WALLACE,
Mayor of Danville, Ky.

WATER WORKS AND POWER EQUIPMENT

The City of Wahoo will receive bids up till 2 o'clock, July 26, for the purchase of the following machinery:

1—225 H.P. either Simple or Tandem Compound Corliss Engine. Or 1—225 H.P. Uniflow Engine, same to be direct connected to a 150 K.V.A., 2300 V. Generator, exciter, switchboards, 25 H.P. Motor and a Triplex Pump.

Specifications are on file in the office of the Water and Light Commissioner, City of Wahoo.

H. M. ROBERTSON,
Superintendent.